#### AIR NAVIGATION REPORTING FORMS

	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-15/RSEQ					EQ	
In	Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)						
	Performance In	npro	vement	Area 1:	Airport Ope	rations	
3. ASBU B0-15/R\$EQ: Impact on Main Key Performance Areas (KPA)							
	Access &	Cans	neity	F	fficiency	<b>Environmen</b>	t Safety
	Equity   _						
Applicable	N ACDU DO 15/DCEO	Y Di	-		Y	Y	N
4.	ASBU B0-15/RSEQ	: Pla	nning 1a				
5. Elements 6. Targets and Implementation Progress (Ground and Air)					Progress		
1. AMAN and time-base	d metering		Decemb	per 201	*	und and An )	
2. Departure managemen			Decemb				
3. Movement Area Capa			Decemb				
	7. ASBU B0-	15/R				enges	
				_	mentation Ar	_	
Elements	<b>Ground System</b>		Avioni	cs	Dwooduwo	S Availability	Operational
	Implementation	In	plement	tation		·	Approvals
	Lack of				Lack of appr		Lack of procedures
1. AMAN and time-	automation	Nil			training. Lac		and inspectors for
based metering	system to support	1 111	-		PBN. Lack of slots		operational
	synchronization Lack of				assignment		approvals
2 Damantuna	automation				Lack of appr training. Lac		Lack of procedures and inspectors for
2. Departure management	system to support	Nil			PBN. Lack o		operational
management	synchronization				assignment	1 51015	approvals
	Syncinomization				Lack of proc	edures for	
					RWY, TWY		Lack of procedures
3. Movement Area	Nil	Nil			capacity calc		and inspectors for
Capacity Optimization					Guidelines fo		operational approvals
						organization.	approvais
8	. ASBU B0-15/RSE						
	8A. ASBU BO			-		_	
Elements	Indicaton Danconto					orting Metrics	. hood makeding
1. AMAN and time- based metering	Indicator: Percenta	_					me-based metering.
2. Departure	Indicator: Percenta				•		me-based metering.
management		_					
3. Movement Area		Supporting metric: Number of international airports with DMAN.  Indicator: Percentage of international aerodromes with Airport-capacity calculated.					
Capacity Optimization							
Capacity Optimization Supporting metric: Number of international airports with Airport-capacity calculated.  8. ASBU B0-15/RSEQ: Performance Monitoring and Measurement							
8B. ASBU B0-15/RSEQ: Performance Monitoring							
Key Performance		M	[etrics (if	not i	ndicate analit	ative henefits)	
Areas		Metrics (if not , indicate qualitative benefits)					
Access & Equity	N/A						
Capacity	Improved airport m			_			
Efficiency	Efficiency is positive	vely i	impacted	as refle	ected by increa	sed runway throu	ughput and arrival
	rates						

Reduction of carbon emissions

N/A

Environment

Safety

0 DE	Regional and National planning for ASBU Modules  2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-65/APTA					NT 4			
									PTΑ
	Optimization of Approach Procedures Including Vertical Guidance								
					Area 1: Airpo				
<b>3.</b> A			PTA: Impac	et on I	Main Key Perf	orman	ce Areas (	KPA	)
		ess & uity	Conneity Efficiency Environment Sofety			Safety			
Applicable		Y	Y		Y		Y		Y
	ASBU I	B0-65/A	PTA: Plann	ing T	argets and Im	plemer	ntation Pro	gres	
5. Elen	nents			6. T	argets and Im Grour)			ogres	ss
1. APV with Bar	o VNA	V	December	2016 -	- Service Provi				
2. APV with SBA					- As per AFI-G			t App	olicable
3. APV with GB.	AS			2018 -	- Initial implem	nentatio	on at some	States	s (service
J. AI V WILLI OD.			providers)	TD 4 -		<u> </u>	1		
	7	7. ASB	<u>U B0-65/AP</u>	<u> 1'A: I</u>	mplementation				
Elements		Grom	nd System		<u>Implementat</u> Avionics	1	ea cedures	0	perational
Ziements			mentation		lementation		ability		Approvals
1. APV with Bar	0			Insu	fficient		ficient	Lac	k of
VNAV	O	NIL ?			ber of	appro			ropriate
				equi	pped aircraft	trainii Limit		trair	
		Network Infrastructure. Not Applicable		Cost of aircraft equipage. Not applicable			certain States		k of
2. APV with SBA	AS					which have			wledge and ropriate
2,111 , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							Inplemented. trail		ning. Not
						1			licable
									k of
		Lack o		Insufficient number of equipped aircraft		Insufficient		ropriate	
3. APV with GB.	AS	Advers	analysis.				appropriate	trair Eva	ung. luation of a
		ionosp				training			operation
								requ	irement
8.					nce Monitorin	_		ient	
Elements	8	<u>A. ASB)</u> 			mplementation ace Indicators		_	trios	
Liements		Indicat			nternational ae		_		ment
1 ADV with Dan	0				PV with Baro				
1. APV with Bard	U	(Where	e the % is de	fined)				_	
			rting metric: aro VNAV	Numb	er of internation	onal airp	ports havin	g app	roved APV
				ge of i	nternational ae	rodrom	es having i	nstru	ment
2. APV with SBA	n				PV with SBAS				
2. AF V WILL SBA	70	Suppor	rting metric:		er of internation				
		with S		go of :	ntornational as	rodro-	oc hovina	nct	mont
				_	nternational ae PV with GBAS		_		
3. APV with GB.	AS				er of internation				
		with G	BAS						
8.	ASBU				nce Monitorir			nent	
		<mark>δВ. AS</mark> l	<u>RA RA-02/V</u>	<u> </u>	Performance :	<u> Monito</u>	oring		

Key Performance Areas	Metrics (if not , indicate qualitative benefits)
Access & Equity	Increased aerodrome accessibility
Capacity	Increased runway capacity
Efficiency	Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays
Environment	Reduced emissions due to reduced fuel burn
Safety	Increased safety through stabilized approach paths

	Regional and National planning for ASBU Modules						
2. R	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-75/SURF						
Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)							
	Performance						
3. ASBU B0-75/SURF: Impact on Main Key Performance Areas (KPA)							
	Access & Equity	Capaci	ty	E	fficiency Environment		Safety
Applicable	Y	Y			Y	Y	Y
4.	ASBU B0-75/SUR	F: Plann	ing Tar				
5. ]	Elements			6.		Implementation ound and Air)	Progress
1. Surveillance system movement (PSR, SSR,		ation	Decem	ber 20	17 Service pro	ovider	
2. Surveillance system			Decem	ber 20	17 Service pro	ovider	
ADS-B capacity)  3. Surveillance system in	for vehicle		Decem	ber 20	17 Service pro	ovider	
4. Visual aids for navig					15 Service pro		
5. Wildlife strike hazard			Decem	ber 20	15 Aerodrom	e operator / wildl	ife committee
6. Display and processi	6. Display and processing information December 2017 Service provider						
	7. ASBU B	0-75/SU			ntation Challe		
				mplei	mentation Arc	ea	
Elements	Ground System Implementation		vionics ementat	ion	Procedures	S Availability	Operational Approvals
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources	Nil		Lack of proctraining.	edures and	Lack of inspectors for operational approvals	
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Nil	Lack of surveillance system on board (ADS-B capacity) on general aviation and some commercial aircraft		Lack of proctraining.	edures and	Lack of guidance materials for inspectors. Lack of inspectors	
3. Surveillance system for vehicle	Lack of adequate financial resources	Nil		Lack of proctraining.	edures and	Lack of guidance materials for inspectors. Lack of inspectors	
4. Visual aids for navigation		Nil			Nil		Lack of calibration capacity
5. Wildlife strike hazard reduction		Nil			Lack of Wild Management		Nil

	Conflict between aviation						
	law and state environment						
	laws. Lack of training.						
	Lack of community support						
8	8. ASBU B0-75/SURF: Performance Monitoring and Measurement						
	8A. ASBU B0-75/SURF: Implementation Monitoring						
Elements	Performance Indicators / Supporting Metrics						
1. Surveillance system	Indicator: Dercentage of international corodromes with SMD / SSD Mode S / ADS D						
for ground surface	Indicator: Percentage of international aerodromes with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement						
movement (PSR, SSR,	Supporting metric: Number of international airports with SMR / SSR Mode S /ADS-B						
ADS-B or							
Multilateration)	Multilateration for ground surface movement.						
2. Surveillance system	Indicator: Percentage of surveillance system on board (SSR transponder, ADS-B capacity).						
on board (SSR	Supporting metric: Number of surveillance system on board (SSR transponder, ADS-B capacity).						
transponder, ADS-B	S-B Supporting metric: Number of surveillance system on board (SSR transponder, ADS-B capacity).						
capacity)	<u> </u>						
3. Surveillance system	Indicator: Percentage of international aerodromes with cooperative transponder system on						
for vehicle							
101 Vehicle	Supporting metric: Number of vehicles with transponder system installed.						
Indicator: Percentage of international aerodromes complying with visual aid requirements as							
4. Visual aids for	per Annex 14						
navigation	Supporting metric: Number of international aerodromes complying with visual aid						
	requirements as per Annex 14						
5. Wildlife strike	Indicator: Percentage of reduction of wildlife incursions.						
hazard reduction	Supporting metric: Number of runway incursions due to wildlife strike.						
8	8. ASBU B0-75/SURF: Performance Monitoring and Measurement						
	8B. ASBU B0-75/SURF: Performance Monitoring						
Key Performance Areas	Metrics (if not, indicate qualitative benefits)						
	Improves portions of the maneuvering area obscured from view of the control tower for						
Access & Equity	vehicles and aircraft. Ensures equity in ATS handling of surface traffic regardless of the						
	traffic's position on the international aerodrome						
Capacity	Sustained level of aerodrome capacity during periods of reduced visibility						
Efficiency	Reduced taxi times through diminished requirements for intermediate holdings based on						
Efficiency	reliance on visual surveillance only. Reduced fuel burn						
Environment	Reduced emissions due to reduced fuel burn						
Safety	Reduced runway incursions. Improved response to unsafe situations. Improved situational						
Salety	awareness leading to reduced ATC workload						

#### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-80/ACDM **Improved Airport Operations through Airport**

Performance Improvement Area 1: Airport Operations						
3	3. ASBU B0-80/A	CDM: Impac	t on Main Key Performar	nce Areas (KPA)		
	Access & Equity	Capacity	Efficiency	Environment	Safety	
Applicable	Y	Y	Y	Y	Y	
4. ASBU B0-80/ACDM: Planning Targets and Implementation				ntation Progress		
5. Elements			6. Targets and Implementation Progress (Ground and Air)			
1. Airport – CDM			December 2015 – Airport Operator, ANSPs, aircraft operators			
2. Aerodrome certific	cation		December 2015 – State CAA			
3. Airport planning			December 2017 – Airport	t Operators		
4. Heliport operation			December 2017 – State CAA			
5. SMS implementati	on		December 2014 – Aerodrome Operators			
6. Development of regulations and technical guidance material for runway safety			December 2014 – State CAA			
7. Development and implementation of runway safety programmes and reduce runway-related accidents and serious incidents to no more than eight			December 2014 – State C	:AA		

7. ASBU B0-80/ACDM: Implementation Challenges

per year.

		Implement	tation Area	
Elements	Ground System	Avionics	Procedures	Operational
	Implementation	Implementation	Availability	Approvals
1. Airport – CDM	Interconnection of ground systems of different partners for Airport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil
2. Aerodrome certification	i imbiemeniaiion oi - i Nii		Lack of procedures. Lack of training	Lack of adequately trained inspectors
3. Airport planning	Nil	Nil	Lack of procedures	Lack of adequately trained inspectors
4. Heliport operation	Lack of regulations	Nil	Lack of procedures	Lack of trained inspectors
5. SMS implementation	Nil	Nil	Lack of States regulations. Lack of training	Lack of high level management commitment
6. Development of regulations and technical guidance material for runway safety	Nil	Nil	Lack of States regulations	Lack of high level management commitment
7. Development and implementation of runway safety programmes and reduce runway-related accidents and	Nil	Nil	Lack of standards from ICAO. Lack of States regulations. Lack of training.	Lack of high level management commitment

serious incidents to no more							
than eight per year.	NO 00/4 CD3.5 D	75.4	17.5				
		ormance Monitoring					
	ASBU B0-80/ACL	M: Implementation N					
Elements			ators / Supporting Mo				
		Percentage of internation					
1. Airport – CDM	CDM	metric: Number of inte		•			
2. Aerodrome certification		Percentage of certified i					
2. Actodronic certification		metric: Number of cert					
3. Airport planning		Percentage of internation					
5.7 Import planning		metric: Number of inte					
4. Heliport operation		Percentage of Heliports					
		Supporting metric: Number of Heliports with operational approval					
5. SMS implementation		Percentage of aerodrome	e operators having imp	olemented SMS			
6. Development of regulations and							
technical guidance material for run	way Indicator:	Indicator:					
safety							
7. Development and implementation							
runway safety programmes and rec		Indicator: Percentage of aerodromes with local runway safety teams					
runway-related accidents and serio		(LRST)					
incidents to no more than eight per	•						
		ormance Monitoring					
	<b>B. ASBU B0-80/AC</b>	DM: Performance Mo					
Key Performance Areas			icate qualitative bene	efits)			
Access & Equity		equity on the use of aero					
		ise of existing impleme					
Capacity		Reduced workload, bett					
		manage flights. Enhanced aerodrome capacity according to the demand.					
		perational efficiency (f					
Efficiency		Reduced fuel burn due to reduced taxi time and lower aircraft engine run					
		time. Improved aerodrome expansion in accordance with Master Plan					
Environment		Reduced emissions due to reduced fuel burn					
Safety	N/A						

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-25/FICE Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

Performance Improvement Area 2: Global Interoperable Systems and Data – Through Globally Interoperable System-Wide Information Management

3. ASBU B0-25/FICE: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Efficiency	Environment	Safety
Applicable	N	Y	Y	Y

4. ASBU B0-25/FICE: Planning Targets and Implementation Progress

ii 1152 c 20 20/11 c 20 1 iuming 1 u gous una imprementation 1 1 og 1 c 50			
5. Elements	6. Targets and Implementation Progress (Ground and Air)		
1. Complete AMHS implementation at States still not counting with this item	December 2014 – Services provider		
2. AMHS interconnection	December 2014 – Services provider		
3. Implement AIDC/OLDI at some States automated centres	June 2014 – Services provider		
4. Implement operational AIDC/OLDI between adjacent ACCs	June 2018 – Services provider		
5. Implement the AFI Comn regional network	June xxxx – Services provider		

7. ASBU B0-25/FICE: Implementation Challenges

	Implementation Area						
Elements	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals			
1. Complete AMHS implementation at States still not counting with this item	Nil	Nil	Nil	Nil			
2. AMHS interconnection	TPDI negotiations between MTAs	Nil	Nil	Nil			
3. Implement AIDC/OLDI at some States automated centres	Nil	Nil	Nil	Nil			
4. Implement operational AIDC/OLDI between adjacent ACCs	Compatibility between AIDC or OLDI systems from various manufacturers	Nil	Nil	Nil			
5. Implement the AFI Comn regional network	Nil	Nil	Nil	Nil			

### 8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8A. ASBU B0-25/FICE: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Complete AMHS implementation at States still not counting with this item	Indicator: Percentage of States with AMHS implemented Supporting metric: Number of AMHS installed
2. AMHS interconnection	Indicator: Percentage of States with AMHS interconnected with other AMHS
2. AWITIS Interconnection	Supporting metric: Number of AMHS interconnections implemented
3. Implement AIDC/OLDI at some	Indicator: Percentage of ATS units with AIDC/OLDI
States automated centres	Supporting metric: Number of AIDC or OLDI systems installed
4. Implement operational	Indicator: Percentage of ACCs with AIDC or OLDI systems interconnections
AIDC/OLDI between adjacent	implemented
ACCs	Supporting metric: Number of AIDC interconnections implemented.

5. Implement the AFI Comn regional network	Indicator: Percentage of phases completed for the implementation of the AFI digital network Supporting metric: Number of phases implemented				
8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8B. ASBU B0-25/FICE: Performance Monitoring					
Key Performance Areas	Metrics (if not, indicate qualitative benefits)				
Access & Equity	Nil				
Capacity	Reduced controller workload and increased data integrity supporting reduced separations, translating directly to cross-sector or boundary-capacity flow increases				
Efficiency	The reduced separation can also be used to more frequently offer aircraft flight levels closer to the optimum; in certain cases, this also translates into reduced en-route holding.				
Environment	Nil				
Safety	Better knowledge of more accurate flight plan information				

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-105/AMET Meteorological Information Supporting Enhanced Operational Efficiency and Safety

Performance Improvement Area 2: Global Interoperable Systems and Data

- Through Globally Interoperable System-Wide Information Management

3. ASBU B0-105/AMET: Impact on Main Key Performance Areas (KPA)										
	Access & Capacity Efficiency Environment Safety									
Applicable	Y	Y YY Y Y								

#### 4. ASBU B0-105/AMET: Planning Targets and Implementation Progress

5. Elements	6. Targets and Implementation Progress (Ground and Air)				
1. WAFS	In process of improvement				
2. IAVW	In process of improvement				
3. Tropical cyclone watch	In process of improvement				
4. Aerodrome warnings	In process of improvement				
5. Wind shear warnings and alerts	MET provider services / 2015				
6. SIGMET	MET provider services / 2015				
7. QMS/MET	MET provider services / 2018				
8 8 Other OPMET Information (METAR SPECI TAF)	In process of improvement				

#### 7. ASBU B0-105/AMET: Implementation Challenges

	Implementation Area									
Elements	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals						
1. WAFS	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A						
2. IAVW	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A						
3. Tropical cyclone watch	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A						
4. Aerodrome warnings	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A						
5. Wind shear warnings and alerts	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A						
6. SIGMET	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A						
7. QMS/MET	Nil	Commitment of top management	N/A	N/A						
8. 8. Other OPMET Information (METAR, SPECI, TAF)	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A						

### 8. ASBU B0-105/AMET: Performance Monitoring and Measurement 8A. ASBU B0-105/AMET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. WAFS	Indicator: Percentage of States implementation of WAFS internet File Service (WIFS)

	Supporting metric: Number of States implementation of WAFS internet File Service (WIFS)
2. IAVW	Indicator: Percentage of international aerodromes/MWOs with IAVW procedures implemented
2. 11. 11	Supporting metric: Number of international aerodromes/MWOs with IAVW procedures implemented
	Indicator: Percentage of international aerodromes/MWOs with Tropical cyclone watch procedures implemented
3. Tropical cyclone watch	Supporting metric: Number of international aerodromes/MWOs with Tropical cyclone watch procedures implemented
4. Aerodrome warnings	Indicator: Percentage of international aerodromes/AWOs with Aerodrome warnings procedures implemented
4. Aerodrome warmings	Supporting metric: Number of international aerodromes/AWOs with Aerodrome warnings procedures implemented
5 Wind shoon manings	Indicator: Percentage of international aerodromes/AWOs with IAVW procedures
5. Wind shear warnings and alerts	implemented Supporting metric: Number of international aerodromes/AWOs with IAVW procedures implemented
	Indicator: Percentage of international aerodromes/AWOs with SIGMET procedures
6. SIGMET	implemented Supporting metric: Number of international aerodromes/AWOs with SIGMET procedures implemented
7. QMS/MET	Indicator: Percentage of MET Provider States with QMS/MET implemented Supporting metric: Number of MET Provider States with QMS/MET certificated
8. Other OPMET	Indicator: Percentage of OPMET available at international aerodrome AMOs/MWOs
Information (METAR,	Supporting metric: Number of international aerodromes/MWOs issuing required OPMET
SPECI, TAF)	information
<b>8.</b> A	ASBU B0-105/AMET: Performance Monitoring and Measurement
	8B. ASBU B0-105/AMET: Performance Monitoring
<b>Key Performance Areas</b>	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	Optimized usage of airspace and aerodrome capacity due to MET support
Efficiency	Reduced arrival/departure holding time, thus reduced fuel burn due to MET support
Environment	Reduced emission due to reduced fuel burn due to MET support
Safety	Reduced incidents/accidents in flight and at international aerodromes due to MET support

# -12 1. FORMULAIRE DE RAPPORT DE NAVIGATION AERIENNE (ANRF) Planification Régionale AFI pour les Modules ASBU

Serv Per – 1	rice Improvemen formance Impro Through Globall	t through l vement Ai y Interope	Digital Ac rea 2: Glo rable Sys	eronautica bal Intero tem-Wide	l Inform perable Informa	IVE – B0-30/DATM nation Management Systems and Data ntion Management				
3. ASBU B0-30/DATM Access & Equity			acity	Efficie		Environment	Safety			
Applicable	N	_	N	N		Y	Y			
4.	<b>ASBU B0-30/D</b>	ATM: Pla	nning Ta			entation Progress				
	Elements					d Implementation P Fround and Air)	rogress			
1. QMS for AIM December 2015										
2. e-TOD implementat				mber 2016						
3. WGS-84 implementati 4. AIXM implementati				emented ember 2018						
5. e-AIP implementation				mber 2018						
6. Digital NOTAM	)II			mber 2018						
O. Digital IVO ITAVI	7. ASRI	I R0-30/D		plementat	ion Cha	llenges				
	7, 11,52	C D C C C C C C C C C C C C C C C C C C	11111	Implem						
Elements		l System entation		ionics nentation		cedures Availability	Operational Approvals			
1. QMS for AIM	1		•		Lack o	f procedures to allow	11			
2. e-TOD implementat		electronic				s provide digital AIS				
3. WGS-84 implement		. Lack of				on-board devices, in				
4. AIXM implementati			Nil			lar electronic flight	Nil			
5. e-AIP implementation	J11	internet				EFBs). Lack of				
6. Digital NOTAM	protocol	services			trainin person	g for AIS/AIM nel.				
	8. ASBU B0-30									
	8A. ASB			plementat						
Elements	Y 11					upporting Metrics				
1. QMS for AIM				es QMS cer of States QM		ication				
2. e-TOD implementat	17 111		-	es e-TOD in	•	ted D implemented				
3. WGS-84 implement	ation Indicator	:: Percentag	ge of WGS	S-84 impler	nented	•				
3. Web of implement	Supporti	_				-84 implemented				
4. AIXM implementati	On I	Indicator: Percentage of States with AXIM implemented								
1	Supporti	Supporting metric: Number of States with AXIM implemented								
5. e-AIP implementation	n l	Indicator: Percentage of States with e-AIP implemented Supporting metric: Number of States with e-AIP implemented								
						'AM implemented				
6. Digital NOTAM						l NOTAM implement	ed			
	8. ASBU B0-30									
				Performan						
Key Performance Areas Metrics (if not, indicate qualitative benefits)										
Access & Equity	N/A									
Capacity	N/A									
Efficiency	* *		•	•	•	ation; Support aeronal implementation of PB				
Environment	Reduced	amount of	paper for	promulgat	ion of in	formation				
Safety	Reduction	on in the nu	mber of p	ossible inc	onsisten	cies				

## -14 **1. AIR NAVIGATION REPORT FORM (ANRF)**

	Regional a				ning for	,	,			
	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-10/FRTO									
Improved Operations through Enhanced En-route Trajectories Performance Improvement Area 3: Optimum Capacity and Flexible Flights										
T CHO	-			_	ollaborat			riigi	iits	
3. A	SBU B0-10/FRT							(KPA	.)	
	Access & Equity	Ca	apacity	y	Efficie	ency	Environm	ent	Safety	
<b>Applicable</b>	Y		Y		Y	•	Y		N	
	SBU B0-10/FR7	O: Pl		g Tai	rgets and	Implen	nentation Pr	ogres		
5. Elements  6. Targets and Implementation (Ground and Air)								Progress		
1. Airspace plann					mber 201	8				
2. Flexible use of					mber 201					
3. Flexible routing		ου 10/			mber 201		allangag			
	7. ASBU I	30-10/	TKIU		plementa olementa					
Elements	Ground Syst	em	A	Vion			cedures	0	perational	
	Implementati				ntation		ilability		Approvals	
	Lack of organiz	zed								
1 4.	and managed	. 41				T 1	C			
<ol> <li>Airspace planning</li> </ol>	airspace prior to time of flight.		Nil			Lack of Procedures				
praining	of AIDC WGS-84 Survey				Trocedures					
					Lack of					
2. Flexible use	Nil		Nil		implementation FUA Guidance					
of airspace						ordination				
				agreeme						
			Insufficient							
3. Flexible			number of equipped aircraft /		Lack o	f LOAs	Poo	r percentage		
routing	ADS-C/CPDLC		Lack of FANS		and procedures			eet approvals		
			1/A. lack of		_					
0	ACDII DO 10/E	ото.	ACAF		aa Mamid		.d Magguera			
8.	ASBU B0-10/FI 8A. ASBU I							пеш		
Elements							orting Metri	cs		
1. Airspace planning	Not assigned In									
2. Flexible use	Indicator: Perce			e seg	regated a	irspaces	are available	for c	ivil	
of airspace	operations in th			c	11 .					
1	Supporting met Indicator: Perce						civii flights			
3. Flexible	Supporting met					memed				
routing	Supporting met				-	1				
8.	ASBU B0-10/FI					_		nent		
Key	8B. ASBU	B0-1	U/FKT	O: P	erformai	nce Mor	ntoring			
Rey Performance		Met	trics (i	f not	, indicate	e qualita	ative benefit	s)		
Areas										
Access & Equity	Better access to airspace	airspa	ace by	a red	uction of	the perr	nanently segr	egate	d volumes of	

	Flexible routing reduces potential congestion on trunk routes and at busy crossing
Capacity	points. The flexible use of airspace gives greater possibilities to separate flights
	horizontally. PBN helps to reduce route spacing and aircraft separations.
	In particular the module will reduce flight length and related fuel burn and
Efficiency	emissions. The module will reduce the number r of flight diversions and
	cancellations. It will also better allow avoiding noise-sensitive areas.
Environment	Fuel burn and emissions will be reduced
Safety	N/A

	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-35/NOPS							
Impr	Improved Flow Performance through Planning based on a Network-Wide view							
Por	formanca I	mnrovement A	ros 3: N	ptimum Capacity an	d Flavible Flights			
	TOT III AIICE II			Collaborative ATM	d Flexible Flights			
3.	ASBU B0-			Iain Key Performan	ce Areas (KPA)			
Access &								
	Equity			Efficiency	Environment	Safety		
Applicable	Y		Y	Y	Y	Y		
4.	. ASBU BO	-35/NOPS: Plai	nning Ta	argets and Implemen				
5. 1	Elements				Implementation Pro ound and Air)	gress		
1. Air Traffic Flow Ma	nagement		Decem	ber 2015	unu anu Air)			
1.7111 1141110 110 17 1710		ASBU B0-35/N	1	nplementation Chall	enges			
		= = = = 30/1	~ ~ ~	Implementation	_			
Elements		Ground Sys	stem	Avionics	Procedures	Operational		
		Implementa		Implementation	Availability	Approvals		
		Lack for system						
1 A T CC . El M.		software for ATFM. Lack of ATFM units		NT:1	Lack of ATFM and			
1. Air Traffic Flow Ma	inagement	implemented.	1 units	Nil	CDM procedures. Lack of training	****		
		Funding			Lack of training			
	8. ASBU E		erforma	nce Monitoring and	 Measurement			
				nplementation Moni				
Elements				rmance Indicators / S				
1. Air Traffic Flow Ma	nagement			f implemented FMUs				
1.7111 Truffic 110W Will				mber of States with A		ted		
				nce Monitoring and				
Key Performance		). ASDU DU-35/		Performance Monito ics (if not, indicate q				
Key Terrormance	Aicas	Improved acce			· · · · · · · · · · · · · · · · · · ·	z avoiding		
Access & Equity		Improved access and equity in the use of airspace or aerodrome by avoiding disruption of air traffic. ATFM processes take care of equitable distribution of						
		delays						
				ailable capacity, abili	•			
Capacity				ce. Number of aircraft	fts in a defined volun	ne or airspace for		
		a period of tim			0.01			
Efficiency				to better anticipation	ot flow issues; Reduc	ed block times		
-		and times with			the ground with shi	t anginas: ar at		
Environment				elays are absorbed on hrough speed or route				
Zii vii OliiiiCiit		emissions per		inough speed of foute	management. Reduc	Cu CO2		
Safety				f undesired sector over	erloads			

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS ACAS Improvements								
Pe	Performance Improvement Area 3: Optimum Capacity and Flexible Flights  – Through Global Collaborative ATM							
3.	ASBU BO				Main Key Performa	nce Areas (KPA)		
	Access Equi		Cap	acity	Efficiency	Environment	Safety	
Applicable	N		•	N	Y	N	Y	
4.	ASBU BO	)-101/A	CAS: Pla	nning T	argets and Impleme			
5.	Elements				0	Implementation P	rogress	
				2012.2		ound and Air)		
1. ACAS II (TCAS Ve		ACDI	DO 101/A	2013-2		11		
	7.	ASBU	BU-101/A	CAS: I	mplementation Cha			
Elements		Cre	ound Syct	tom	Implementation Area Avionics Procedure		Operational	
Elements		Ground System Implementation		Implementation	Availability	Approvals		
1. ACAS II (TCAS Ve	ersion 7.1)	Nil	3101110110	2011	Equipage	Nil	Nil	
		B0-101/	ACAS: P	erform	ance Monitoring and	l Measurement		
					mplementation Moi			
Elements					mance Indicators /		S	
1. ACAS II (TCAS Ve	ersion 7.1)				aircrafts that are equention in number of R			
	8. ASBU				ance Monitoring and			
		B. ASB	U <b>B0-101</b>		Performance Moni			
Key Performance	Areas			Metri	cs (if not, indicate q	ualitative benefits)		
Access & Equity		N/A						
Capacity					l reduce unnecessary	resolution advisory	(RA) and then	
		reduce trajectory deviations						
Efficiency		N/A						
Environment		N/A	1 1	<u> </u>		11.0:	1	
Safety		Reduced number of potential AIR-PROX. ACAS increases safety in the case of						
	breakdown of separation							

#### 1. AIR NAVIGATION REPORT FORM (ANRF)

Regional and National planning for ASBU Modules

Access &

2. Implementation of Multilateration

3. Automation system (Presentation)

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-84/ASUR Improved Flow Performance through Planning based on a Network-Wide view

Performance Improvement Area 3: Optimum Capacity and Flexible Flights
- Through Global Collaborative ATM

3.	ASBU B0-84/ASUR:	Impact on Main Key Perforn	nance Areas (KPA)
•		input on Main they i citoria	idilee illed (lill il)

	Equity	Capacity	Efficiency	Environment	Safety			
Applicable	N	Y	N	N	Y			
4. ASBU B0-84/ASUR: Planning Targets and Implementation Progress								
5. Elements			6. Targets and Implementation Progress					
5.	Elements		(Ground and Air)					
1. Implementation of	ADS-B	June 20	June 2018 – Users and service provider					

#### 7. ASBU B0-84/ASUR: Implementation Challenges

June 2018 – Users and service provider

June 2017 – Users and service provider

		Implementation A	Area	
Elements	Ground System Avionics Implementation Implementation		Procedures Availability	Operational Approvals
1. Implementation of ADS-B	Lack of ADS-B systems implementation due to recent implementation of conventional surveillance systems	Lack of ADS-B implementation in general aviation, and old commercial fleet	Lack of procedures	Lack of inspector s with appropriate capability
2. Implementation of Multilateration	Facilities of remote stations. Establishment of communications networks	Nil	Nil	Lack of inspector s with appropriate capability
3. Automation system (Presentation)	Lack of any automation functionality	Nil	Nil	Nil

### 8. ASBU B0-84/ASUR: Performance Monitoring and Measurement 8A. ASBU B0-84/ASUR: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics			
1. Implementation of ADS-B	Indicator: Percentage of international aerodromes with ADS-B implemented			
1. Implementation of ADS-B	Supporting metric: Number of ADS-B implemented			
2. Implementation of	Indicator: Percentage of Multilateration system implemented Supporting			
Multilateration	metric: Number of Multilateration system implemented Indicator:			
3. Automation system	Percentage of ATS units with automation system implemented			
(Presentation)	Supporting metric: Number of automation system implemented in ATS units			

#### 8. ASBU B0-84/ASUR: Performance Monitoring and Measurement 8B. ASBU B0-84/ASUR: Performance Monitoring

	8
Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima. TMA surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.
Efficiency	N/A
Environment	N/A
Safety	Reduction of the number of major incidents. Support to search and rescue

#### 1. AIR NAVIGATION REPORT FORM (ANRF)

Regional and National planning for ASBU Modules

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-102/SNET Increased Effectiveness of Ground-based Safety Nets

Performance Improvement Area 3: Optimum Capacity and Flexible Flights
- Through Global Collaborative ATM

3. ASBU B0-102/SNET: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity		Efficiency	Environment	Safety			
Applicable	N	N		NN	N	Y			
4. ASBU B0-102/SNET: Planning Targets and Implementation Progress									
			6. Targets and Implementation Progress						
5. Elements			(Gı	round and Air)					
1. Short Term Conflict Alert (STCA)  June 2014 / Service provider 2013-2018									
2. Area Proximity Wa									

4. Dangerous Area Infringement Warning (DAIW) 2013-2018

3. Minimum Safe Altitude Warning (MSAW)

7. ASBU B0-102/SNET: Implementation Challenges

June 2014

	Implementation Area							
Elements	<b>Ground System</b>	Avionics	Procedures	Operational				
	Implementation	Implementation	Availability	Approvals				
1. Short Term Conflict Alert (STCA)	Nil Funding	Nil	Nil	Nil				
2. Area Proximity Warning (APW)	Nil Funding	Nil	Nil	Nil				
3. Minimum Safe Altitude Warning (MSAW)	Nil Funding	Nil	Nil	Nil				
4. Dangerous Area Infringement Warning (DAIW)	Funding							

#### 8. ASBU B0-102/SNET: Performance Monitoring and Measurement 8A. ASBU B0-102/SNET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Short Term Conflict	Indicator: Percentage of ATS units with ground-based safety nets (STCA) implemented
Alert (STCA)	Supporting metric: Number of safety net (STCA) implemented
2. Area Proximity	Indicator: Percentage of ATS units with ground-based safety nets (APW)implemented
Warning (APW)	Supporting metric: Number of safety net (APW)implemented
3. Minimum Safe Altitude Warning (MSAW)	Indicator: Percentage of ATS units with ground-based safety nets (MSAW) implemented Supporting metric: Number of safety net (MSAW) implemented
4. Dangerous Area Infringement Warning (DAIW)	Indicator: Percentage of ATS units with ground-based safety nets (DAIW) implemented Supporting metric: Number of safety net (DAIW) implemented

#### 8. ASBU B0-102/SNET: Performance Monitoring and Measurement 8B. ASBU B0-102/SNET CAS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	N/A
Efficiency	N/A
Environment	N/A
Safety	Significant reduction of the number of major incidents

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-05/CDO Improved

Performance	ity and Efficiency Improvement Ar	ea 4: Effic	ient Flig	ht Path – T	hrough T	Trajectory-based	,
3	ASBU B0-05/C Access & Equity	CDO: Impa Capa		ain Key Per Efficie		Environment	Safety
Applicable	N	N	Ī	Y		N	NY
4	4. ASBU B0-05/0	CDO: Plan	ning Ta				
	Elements				-	Implementation P und and Air)	Progress
1. CDO implementation				per 2017			
2. PBN STARs impler				per 2017			
	7. ASB	U B0-05/0	CDO: Im	plementatio			
					entation		
Elements	Implem	l System entation		rionics mentation		Procedures vailability	Operational Approvals
1. CDO implementation	on The ground trajector calculating function need to a upgrade	y on will able	CDO F	unction	LOAs and Training		In accordance with applicable requirements
2. PBN STARs implementation	Airspace	· ·	Nil		LOAs and Training		
	8. ASBU B0-05				_		
	8A. ASB			plementatio			
Elements	T., 1: / -					pporting Metrics	
1. CDO implementation	on Supporti	ng metric:	Number	of internation	onal aeroc	s/TMAs with CDC dromes/TMAs with	n CDO
2. PBN STARs		tor: Percentage of international aerodromes with PBN STARs implementation					
implementation	1 1	_					Rs implementation
	8. ASBU B0-05 8B. AS			ce Monitor erformance			
Key Performance A			Metrics	(if not, ind	licate qua	alitative benefits)	
Access & Equity N/A							
Capacity	Increased Terminal Airspace Capacity N/A						
Efficiency	Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.						
Environment	Reduced	emissions	s as a resu	ılt of reduce	d fuel bur	n.	
Safety				and stabiliz nt into terrai	* *	ach. Reduction in t	he number of

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-20/CCO Improved

						Frajectory-based (	Operations	
3	ASBU B0-20/0 Access &	CCO: Impa	act on Ma	ain Key Pei	forman	ce Areas (KPA)		
	Equity	Canacity Efficiency Environment		Safety				
Applicable	Y	N		Y		NY	NY	
4	4. ASBU B0-20/	CCO: Plar	ning Tai					
<b>5.</b> ]	Elements			6. Targ		Implementation Pound and Air)	rogress	
1 CCO implementation	. CCO implementation				(Gr	ouna ana Air)		
2. PBN SIDs implement			Decemb Decemb					
2. TBT (BIB) Impleme		BU B0-20/0	l .	plementation	n Chall	enges		
				Implem				
<b>Elements</b>	Groun	d System	Av	ionics		Procedures	Operational	
	Implen	Implementation		Implementation		Availability	Approvals	
							In accordance	
1. CCO implementation	n Nil	Nil		Nil			with applicable	
							requirements	
2. PBN SIDs impleme	ntation   Airspac	Airspace Design					Approvals of procedures	
	8. ASBU B0-20	0/CCO: Pe	rforman	ce Monitor	ing and	Measurement	procedures	
	8A. ASI	BU B0-20/0	CCO: Im	plementatio	n Moni	toring		
Elements						upporting Metrics		
1. CCO implementation						s with CCO implen		
	Support					orts with CCO impl		
2. PBN SIDs impleme						s with PBN SIDs in		
	8. ASBU B0-20					orts with PBN SIDs	приненией	
				erformance				
Key Performance A						alitative benefits)		
Access & Equity	***							
Capacity		ed Termina						
Efficiency						ient aircraft operati	ing profiles.	
Reduction in the number of required radio transmissions.  Authorization of operations where noise limitations would otherwise result in							1. 1	
Environment								
Environment		operations being curtailed or restricted. Environmental benefits through reduced emissions.						
G. C. :			ght paths	. Reduction	in the nu	mber of required ra	adio transmission	
Safety				ontrol workl				

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE - B0-40/TBO

					igh Trajectory-l		perations
3.	ASBU B0-40/11 Access & Equity	Capac	t on Main Key Perform city Efficiency		Environr		Safety
Applicable	N	Y		Y	Y		Y
4.	ASBU B0-40/T	BO: Plann	ing Targ		mentation Prog		
	ements				and Implement (Ground and A		ogress
1. ADS-C over oceanic a			018 – Service pr				
2. Continental CPDLC	- 4 070	T. T. O. 40 //D)	1	)18 – Service pr			
	7. ASB	U <b>B0-40/11</b>		lementation C			
Elements	Ground S	vetom		Implementation Avionics	Procedures		perational
Elements	Implemen			lementation	Availability		Approvals
1. ADS-C over oceanic and remote areas	ceruice provider and		Implementation of ADS-C in general aviation pending		Implementati on of GOLD procedures pending		f duly trained ors for approval ations
Funding and limited link service provider and infrastructure			Implementation of CPDLC in general aviation pending		Implementati on of GOLD procedures pending		f duly trained ors for approval ations
8				e Monitoring a dementation M	and Measureme	nt	
Elements	011.1102				Supporting Met	rics	
1. ADS-C over oceanic	Indicator: Perc			ADS-C impler			
and remote areas					procedures over o	ceanic a	nd remote areas
2. Continental CPDLC	Indicator: Perc						
					procedures over		tal? areas
ð				e Monitoring a rformance Mo	and Measuremen onitoring	nt	
Key Performance A	reas		Metrics	(if not, indica	te qualitative be	nefits)	
Access & Equity	N/A						
Capacity					for a period of tir		
Efficiency Kilogrammes of f						tion	
Environment				ult of reduced f		• .	
Safety adherence monitor rescue. Reduced o			Tety nets supports cleared level adherence monitoring, route oring, danger area infringement warning and improved search and occurrences of misunderstandings; solution to stuck microphone sed situational awareness				

	<del>g</del>						
1	CGIONAL /NATION						$\mathbf{E}\mathbf{Q}$
Improved Traffic Flow through Runway Sequencing (AMAN/DMAN)							
	Performance I	mnro	voment	A roo 1.	Airport Ope	rations	
3	ASBU B0-15/RSEQ						
3.	Access &				·*		
	Equity	Capa	city	E	fficiency	Environment	Safety
Applicable	N	Y	•		Y	Y	N
4.	ASBU B0-15/RSEQ	: Plai	nning Ta				
5 El	ements			6.	0	mplementation	Progress
					,	und and Air)	
1. AMAN and time-base			Decemb				
2. Departure managemen			Decemb				
3. Movement Area Capa	<u> </u>	1.E./D	Decemb				
	7. ASBU B0	-15/K	SEQ: In				
Elements	Ground System	T	Avionio		ementation An	ea	Operational
Elements	Implementation		Aviolic		Procedures Availability		Approvals
	Lack of	1111	picinent	anon	Lack of appr	opriate	Lack of procedures
1. AMAN and time-	automation				training. Lac		and inspectors for
based metering	system to support Nil		Nil		PBN. Lack of slots		operational
8	synchronization				assignment		approvals
	Lack of				Lack of appropriate		Lack of procedures
2. Departure	automation	n N			training. Lac		and inspectors for
management	system to support	Nil	INII		PBN. Lack o	f slots	operational
	synchronization				assignment		approvals
					Lack of procedures for		Lack of procedures
3. Movement Area						& platform	and inspectors for
Capacity Optimization	Nil   Ni		Nil		capacity calc		operational
					Guidelines fo		approvals
0	A CDII DO 15/DCE	D. D.	wfa www.a.	oo Mo		organization.	
o	. ASBU B0-15/RSE 8A. ASBU B0						
Elements						orting Metrics	
1. AMAN and time-	Indicator: Percenta						e-based metering.
based metering							me-based metering.
2. Departure	Indicator: Percenta	ge of	internation	onal aeı	rodromes with	DMAN.	
management	Supporting metric:	Num	ber of int	ternatio	nal airports wi	th DMAN.	
3. Movement Area	Indicator: Percenta	ge of	internation	onal aeı	odromes with	Airport-capacity	calculated.
Capacity Optimization	Supporting metric:				_		ity calculated.
8	. ASBU B0-15/RSE						
8B. ASBU B0-15/RSEQ: Performance Monitoring							
Key Performance Metrics (if not, indicate qualitative benefits)							
Areas	NT/A						
Access & Equity	N/A	101/01	ant area	canacit	y through ont	mization	
Capacity	Improved airport n				• • •		1 , 1 , 1
Efficiency	Efficiency is positi	vely i	mpacted	as refle	ected by increa	sed runway throu	ignput and arrival
	rates  Deduction of corbo						
Environment	Reduction of carbo	ın emi	ssions				
Safety	N/A						

	Regional and National planning for ASBU Modules  2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-65/APTA								
· ·				_					TA
Optimization of Approach Procedures Including Vertical Guidance Performance Improvement Area 1: Airport Operations									
3					Area 1: Airpo Iain Key Perf			KDA)	<u> </u>
<b>3.</b> I		ess &	I IA. IIIpac	t on r	lain Key I eii	011116	•		<u> </u>
		uity	Capacity		Efficiency		Environme		Safety
Applicable	1	Y	Y		Y		Y		Y
4.	ASBU 1	B0-65/A	PTA: Plann		argets and Im				
5. Elei	ments			6. T	argets and Im	_		ogres	S
		X 7	D 1	2016	(Groun				
1. APV with Bar 2. APV with SB		. <b>V</b>		-	- Service Provi			t Ann	liaabla
2. APV with SBA	AS				- As per AFI-G				
3. APV with GB	AS			2018 -	- Initial implen	nentat	tion at some s	States	(service
		7 ACD1	providers)	T A . T.	mplomontation	n Cha	allangag		
		ASB	U DU-U3/AP	1A; I	<u>mplementation</u> Implementat		_		
Elements		Gran	nd System		<u> mpiementai</u> Avionics	1	rocedures	Ω	perational
Diements			mentation		lementation		ailability		perational
1 ADV 11 5					ficient		afficient	Lack	
1. APV with Bar	О	NIL?		num	per of	app	ropriate	appr	opriate
VNAV				equi	oped aircraft	trai	ning	train	_
							nited to	Lack	r of
		Network Infrastructure. Not Applicable		Cost of aircraft equipage. Not applicable			ain States	knowledge and appropriate training. Not	
2. APV with SB	AS						ch have		
							lemented.		
						Not	olicable	applicable	
						App	Jicabie	Lack	r of
		Lack o	f cost-						opriate
2 ADV	A C	benefit analysis. Adverse		Insufficient		Insufficient		training.	
3. APV with GB	AS			number of	appropriate training	Eval	uation of a		
		ionosp	here	equipped aircraft		training			operation
								requirement	
8.					nce Monitorii			ent	
Elam anta		A. ASB			mplementation				
Elements		Indicat			ce Indicators nternational ae				mant
					PV with Baro				
1. APV with Bar	O		e the % is de		1 v with Buro	V 1 1/1 1	v procedure	mpic	mented
VNAV		1 '			er of internation	onal a	irports havin	g app	roved APV
			aro VNAV				-	- * *	
					nternational ae				
2. APV with SB	AS	1	•		PV with SBAS	•	•		
	120			Numb	er of internation	onal a	irports havin	g app	roved APV
	with S		go of :	ntomotional a-	no d	mag having !	net	mont	
					nternational ae PV with GBAS				
3. APV with GB	AS		_			_	_		
	Supporting metric: Number of international airports having approved APV with GBAS								
8.	8. ASBU B0-65/APTA: Performance Monitoring and Measurement								
IZ D. C		8B. ASI	BU B0-65/A	PTA:	<b>Performance</b>	Moni	itoring		
Key Performa	ance		Metr	rics (if	not , indicate	qual	itative benef	its)	
Areas						_			

Access & Equity	Increased aerodrome accessibility
Capacity	Increased runway capacity
Efficiency	Reduced fuel burn due to lower minima, fewer diversions, cancellations, delays
Environment	Reduced emissions due to reduced fuel burn
Safety	Increased safety through stabilized approach paths

2. R	REGIONAL /NATI						RF		
	Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)								
	Performance Improvement Area 1: Airport Operations								
3. ASBU B0-75/SURF: Impact on Main Key Performance Areas (KPA)									
	Access & Equity	Capac			fficiency	Environment	Safety		
Applicable	Y	Y			Y	Y	Y		
4.	ASBU B0-75/SU	RF: Planı	ning Ta						
	5. Elements				0	Implementation ound and Air)	Progress		
1. Surveillance system		.•	Decem	iber 20	17 Service pr	ovider			
movement (PSR, SSR,					1				
2. Surveillance system ADS-B capacity)	on board (SSK trans	sponder,	Decem	iber 20	17 Service pr	ovider			
3. Surveillance system	for vehicle		Decem	ber 20	17 Service pr	ovider			
4. Visual aids for navig					15 Service pr				
5. Wildlife strike hazard reduction December 2015 Aerodrome operator / wildlife committee									
6. Display and process	6. Display and processing information December 2017 Service provider								
	7. ASBU B0-75/SURF: Implementation Challenges								
Implementation Area									
Elements	Ground System		Avionics		Procedure	s Availability	Operational		
1 C	Implementation	ı Impl	lementa	tion		,	Approvals		
1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Lack of adequate financial resources	Nil	Nil		Lack of proc training.	edures and	Lack of inspectors for operational approvals		
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Nil	survei on boa capaci genera and so	Lack of surveillance system on board (ADS-B capacity) on general aviation and some commercial aircraft		Lack of proc training.	edures and	Lack of guidance materials for inspectors. Lack of inspectors		
3. Surveillance system for vehicle	Lack of adequate financial resources	Nil					Lack of proc	edures and	Lack of guidance materials for inspectors. Lack of inspectors
4. Visual aids for navigation		Nil			Nil		Lack of calibration capacity		
5. Wildlife strike hazard reduction		Nil			Conflict bet law and state laws. Lack o Lack of com	t Committee. ween aviation e environment f training. munity support	Nil		
8. ASBU B0-75/SURF: Performance Monitoring and Measurement 8A. ASBU B0-75/SURF: Implementation Monitoring									
Teles 4	8A. ASBU								
Elements	Elements Performance Indicators / Supporting Metrics								

1. Surveillance system for ground surface movement (PSR, SSR, ADS-B or Multilateration)	Indicator: Percentage of international aerodromes with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement Supporting metric: Number of international airports with SMR / SSR Mode S /ADS-B Multilateration for ground surface movement.		
2. Surveillance system on board (SSR transponder, ADS-B capacity)	Indicator: Percentage of surveillance system on board (SSR transponder, ADS-B capacity). Supporting metric: Number of surveillance system on board (SSR transponder, ADS-B capacity).		
3. Surveillance system for vehicle	Indicator: Percentage of international aerodromes with cooperative transponder system on vehicles.  Supporting metric: Number of vehicles with transponder system installed.		
4. Visual aids for navigation	Indicator: Percentage of international aerodromes complying with visual aid requirements as per Annex 14 Supporting metric: Number of international aerodromes complying with visual aid requirements as per Annex 14		
5. Wildlife strike	Indicator: Percentage of reduction of wildlife incursions.		
hazard reduction Supporting metric: Number of runway incursions due to wildlife strike.			
	3. ASBU B0-75/SURF: Performance Monitoring and Measurement		
V D£	8B. ASBU B0-75/SURF: Performance Monitoring		
Key Performance Areas	Metrics (if not, indicate qualitative benefits)		
Access & Equity	Improves portions of the maneuvering area obscured from view of the control tower for vehicles and aircraft. Ensures equity in ATS handling of surface traffic regardless of the traffic's position on the international aerodrome		
Capacity	Sustained level of aerodrome capacity during periods of reduced visibility		
Efficiency	Reduced taxi times through diminished requirements for intermediate holdings based on reliance on visual surveillance only. Reduced fuel burn		
Environment	Reduced emissions due to reduced fuel burn		
Safety	Reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload		

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-80/ACDM Improved Airport Operations through Airport

Performance Improvement Area 1: Airport Operations 3. ASBU B0-80/ACDM: Impact on Main Key Performance Areas (KPA)							
3. ASBU B0-80/ACDM: Impact Access & Capacity			Efficiency	Environment	Safety		
Applicable	Y	Y	Y	Y	Y		
4. ASBU B0-80/ACDM: Planning Targets and Implementation Progress							
5. Elements			6. Targets and Implementation Progress (Ground and Air)				
1. Airport – CDM	1. Airport – CDM			December 2015 – Airport Operator, ANSPs, aircraft operators			
2. Aerodrome certification	ation		December 2015 – State CAA				
3. Airport planning			December 2017 – Airport Operators				
4. Heliport operation			December 2017 – State CAA				
5. SMS implementation	on		December 2014 – Aerodrome Operators				
6. Development of regulations and technical guidance material for runway safety			December 2014 – State CAA				
7. Development and implementation of runway safety programmes and reduce runway-related			December 2014 – State C	AA			

7. ASBU B0-80/ACDM: Implementation Challenges

accidents and serious incidents to no more than eight

per year.

	Implementation Area				
Elements	Ground System	Avionics	Procedures	Operational	
	Implementation	Implementation	Availability	Approvals	
1. Airport – CDM	Interconnection of ground systems of different partners for Airport – CDM	Nil	Lack for coordination procedures. Lack of commitment from all stakeholders	Nil	
2. Aerodrome certification	Lack of effective implementation of Annex 14 SARPs	Nil	Lack of procedures. Lack of training	Lack of adequately trained inspectors	
3. Airport planning	Nil	Nil	Lack of procedures	Lack of adequately trained inspectors	
4. Heliport operation	Lack of regulations	Nil	Lack of procedures	Lack of trained inspectors	
5. SMS implementation	Nil Nil		Lack of States regulations. Lack of training	Lack of high level management commitment	
6. Development of regulations and technical guidance material for runway safety	Nil	Nil	Lack of States regulations	Lack of high level management commitment	
7. Development and implementation of runway safety programmes and reduce runway-related accidents and	Nil	Nil	Lack of standards from ICAO. Lack of States regulations. Lack of training.	Lack of high level management commitment	

serious incidents to no more					
than eight per year.					
	/ACDM: Performance Monitoring and Measurement				
Elements	BU B0-80/ACDM: Implementation Monitoring Performance Indicators / Supporting Metrics				
Diements	Indicator: Percentage of international aerodromes with Airport – CDM				
1. Airport – CDM	Supporting metric: Number of international aerodromes with Airport - CDM				
2. Aerodrome certification	Indicator: Percentage of certified international aerodromes Supporting metric: Number of certified international aerodromes				
	Indicator: Percentage of international aerodromes with Master Plans				
3. Airport planning	Supporting metric: Number of international aerodromes with Master P				
4 Halinant anaustian	Indicator: Percentage of Heliports with operational approval				
4. Heliport operation	Supporting metric: Number of Heliports with operational approval				
5. SMS implementation	Indicator: Percentage of aerodrome operators having implemented SMS				
6. Development of regulations and technical guidance material for runway safety	Indicator:				
7. Development and implementation of					
runway safety programmes and reduce	Indicator: Percentage of aerodromes with local runway safety teams				
runway-related accidents and serious	(LRST)				
incidents to no more than eight per year					
	/ACDM: Performance Monitoring and Measurement				
	BU B0-80/ACDM: Performance Monitoring				
Key Performance Areas	Metrics (if not, indicate qualitative benefits)				
Access & Equity	Enhanced equity on the use of aerodrome facilities				
Carranita	Enhanced use of existing implementation for gate and stands (unlock l				
Capacity	capacity). Reduced workload, better organization of the activities to				
	manage flights. Enhanced aerodrome capacity according to the deman Improved operational efficiency (fleet management); and reduced dela				
Efficiency	Reduced fuel burn due to reduced taxi time and lower aircraft engine i				
Littleteney	time. Improved aerodrome expansion in accordance with Master Plan				
Environment	Reduced emissions due to reduced fuel burn				
Safety	N/A				

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-25/FICE Increased Interoperability, Efficiency and Capacity through Ground-Ground Integration

Performance Improvement Area 2: Global Interoperable Systems and Data – Through Globally Interoperable System-Wide Information Management

3. ASBU B0-25/FICE: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Efficiency	Environment	Safety
Applicable	N	Y	Y	Y

4. ASBU B0-25/FICE: Planning Targets and Implementation Progress

ii 1152 C 20/11 C 21 i i i i i i i i i i i i i i i i i i					
5. Elements	6. Targets and Implementation Progress (Ground and Air)				
1. Complete AMHS implementation at States still not counting with this item	December 2014 – Services provider				
2. AMHS interconnection	December 2014 – Services provider				
3. Implement AIDC/OLDI at some States automated centres	June 2014 – Services provider				
4. Implement operational AIDC/OLDI between adjacent ACCs	June 2018 – Services provider				
5. Implement the AFI Comn regional network	June xxxx – Services provider				

7. ASBU B0-25/FICE: Implementation Challenges

	Implementation Area						
Elements	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals			
1. Complete AMHS implementation at States still not counting with this item	Nil	Nil	Nil	Nil			
2. AMHS interconnection	TPDI negotiations between MTAs	Nil	Nil	Nil			
3. Implement AIDC/OLDI at some States automated centres	Nil	Nil	Nil	Nil			
4. Implement operational AIDC/OLDI between adjacent ACCs	Compatibility between AIDC or OLDI systems from various manufacturers	Nil	Nil	Nil			
5. Implement the AFI Comn regional network	Nil	Nil	Nil	Nil			

### 8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8A. ASBU B0-25/FICE: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Complete AMHS implementation at States still not counting with this item	Indicator: Percentage of States with AMHS implemented Supporting metric: Number of AMHS installed
2. AMHS interconnection	Indicator: Percentage of States with AMHS interconnected with other AMHS Supporting metric: Number of AMHS interconnections implemented
3. Implement AIDC/OLDI at some	Indicator: Percentage of ATS units with AIDC/OLDI
States automated centres	Supporting metric: Number of AIDC or OLDI systems installed
4. Implement operational AIDC/OLDI between adjacent ACCs	Indicator: Percentage of ACCs with AIDC or OLDI systems interconnections implemented

	Supporting metric: Number of AIDC interconnections implemented, as per <u>CAR/SAM FASID Table CNS 1Bb</u>				
5. Implement the AFI Comn regional network	Indicator: Percentage of phases completed for the implementation of the AFI digital network Supporting metric: Number of phases implemented				
8. A	8. ASBU B0-25/FICE: Performance Monitoring and Measurement 8B. ASBU B0-25/FICE: Performance Monitoring				
Key Performance Areas	Metrics (if not, indicate qualitative benefits)				
Access & Equity	Nil				
Capacity	Reduced controller workload and increased data integrity supporting reduced separations, translating directly to cross-sector or boundary-capacity flow increases				
Efficiency	The reduced separation can also be used to more frequently offer aircraft flight levels closer to the optimum; in certain cases, this also translates into reduced en-route holding.				
Environment	Nil				
Safety	Better knowledge of more accurate flight plan information				

### 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-105/AMET Meteorological Information Supporting Enhanced Operational Efficiency and Safety

Performance Improvement Area 2: Global Interoperable Systems and Data

Through Globally Interoperable System-Wide Information Management
 ASBU B0-105/AMET: Impact on Main Key Performance Areas (KPA)

	Access & Equity	Capacity	Efficiency	Environment	Safety		
Applicable	pplicable Y		Y	Y	Y		
4. ASBU B0-105/AMET: Planning Targets and Implementation Progress							

#### 6. Targets and Implementation Progress 5. Elements (Ground and Air) 1. WAFS In process of improvement 2. IAVW In process of improvement 3. Tropical cyclone watch In process of improvement In process of improvement 4. Aerodrome warnings 5. Wind shear warnings and alerts MET provider services / 2015 6. SIGMET MET provider services / 2015 7. QMS/MET MET provider services / 2018

7. ASBU B0-105/AMET: Implementation Challenges

In process of improvement

8. 8. Other OPMET Information (METAR, SPECI, TAF)

	Implementation Area							
Elements	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals				
1. WAFS	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A				
2. IAVW	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A				
3. Tropical cyclone watch	Connection to the AFS satellite and public internet distribution systems	Nil	Prepare a contingency plan in case of public internet failure	N/A				
4. Aerodrome warnings	Aerodrome warnings		Local arrangements for reception of aerodrome warnings	N/A				
5. Wind shear warnings and alerts	Connection to the AFTN	Nil	Local arrangements for reception of aerodrome warnings	N/A				
6. SIGMET	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A				
7. QMS/MET	Nil	Commitment of top management	N/A	N/A				
8. 8. Other OPMET Information (METAR, SPECI, TAF)	Connection to the AFTN	Nil	Prepare a contingency plan in case of AFTN systems failure	N/A				

### 8. ASBU B0-105/AMET: Performance Monitoring and Measurement 8A. ASBU B0-105/AMET: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. WAFS	Indicator: Percentage of States implementation of WAFS internet File Service (WIFS)

	Supporting metric: Number of States implementation of WAFS internet File Service (WIFS)						
2. IAVW	Indicator: Percentage of international aerodromes/MWOs with IAVW procedures implemented						
	Supporting metric: Number of international aerodromes/MWOs with IAVW procedures implemented						
	Indicator: Percentage of international aerodromes/MWOs with Tropical cyclone watch procedures implemented						
3. Tropical cyclone watch	Supporting metric: Number of international aerodromes/MWOs with Tropical cyclone watch procedures implemented						
	Indicator: Percentage of international aerodromes/AWOs with Aerodrome warnings procedures implemented						
4. Aerodrome warnings	Supporting metric: Number of international aerodromes/AWOs with Aerodrome warnings procedures implemented						
5 XX: 1 1 ·	Indicator: Percentage of international aerodromes/AWOs with IAVW procedures						
5. Wind shear warnings and alerts	implemented Supporting metric: Number of international aerodromes/AWOs with IAVW procedures implemented						
6. SIGMET	Indicator: Percentage of international aerodromes/AWOs with SIGMET procedures implemented Supporting metric: Number of international aerodromes/AWOs with SIGMET procedures						
	implemented						
7. QMS/MET	Indicator: Percentage of MET Provider States with QMS/MET implemented Supporting metric: Number of MET Provider States with QMS/MET certificated						
8. Other OPMET	Indicator: Percentage of OPMET available at international aerodrome AMOs/MWOs						
Information (METAR,	Supporting metric: Number of international aerodromes/MWOs issuing required OPMET						
SPECI, TAF)	information						
<b>8.</b> A	ASBU B0-105/AMET: Performance Monitoring and Measurement						
8B. ASBU B0-105/AMET: Performance Monitoring							
Key Performance Areas	Metrics (if not, indicate qualitative benefits)						
Access & Equity	N/A						
Capacity Efficiency	Optimized usage of airspace and aerodrome capacity due to MET support						
Ţ ,	Reduced arrival/departure holding time, thus reduced fuel burn due to MET support						
Environment	Reduced emission due to reduced fuel burn due to MET support  Reduced insidents/essidents in flight and at international serodrames due to MET support						
Safety	Reduced incidents/accidents in flight and at international aerodromes due to MET support						

# -34 1. FORMULAIRE DE RAPPORT DE NAVIGATION AERIENNE (ANRF) Planification Régionale AFI pour les Modules ASBU

Ser	vice Impro	ovement	through 1	Digital	Aeronautica	l Inforn	IVE – B0-30/DATM nation Management  Systems and Data			
_	Through (	Globally	Interope	rable S	System-Wide	Informa	ntion Management			
3. ASBU B0-30/DATM: Impact on Main Key Performance Areas (KPA)  Access & Capacity Efficiency Environment Safety							Safety			
Applicable	Equi N			<u>,</u>	N		Y	Y		
4	4. ASBU B0-30/DATM: Planning Targets and Implementation Progress									
5.	Elements	s			6. Ta		d Implementation Pr round and Air)	ogress		
1. QMS for AIM				De	ecember 2015		around and Air)			
2. e-TOD implementar	tion				ecember 2016					
3. WGS-84 implement					plemented					
4. AIXM implementat					ecember 2018					
5. e-AIP implementati					ecember 2015					
6. Digital NOTAM				De	ecember 2018					
8	7.	ASBU	B0-30/D	ATM:	Implementat	ion Cha	llenges			
						entation				
Elements		Ground Impleme			Avionics lementation	Pro	cedures Availability	Operational Approvals		
1. QMS for AIM							of procedures to allow			
2. e-TOD implementar		Lack of electronic					s provide digital AIS			
3. WGS-84 implement		database. Lack of		2 7 1 1	I		on-board devices, in	3711		
4. AIXM implementat		lectronic					lar electronic flight	Nil		
5. e-AIP implementati	1011	based on inte				bags (EFBs). Lack of				
6. Digital NOTAM proto			protocol services		trainin		g for AIS/AIM nel			
	8. ASBU	B0-30/I	OATM: P	 erforn	nance Monito	1	d Measurement			
	<b>8</b> A	A. ASBU	B0-30/D	ATM:	<b>Implementat</b>	tion Moi	nitoring			
Elements				Perfor	mance Indica	ators / S	upporting Metrics			
1. QMS for AIM	l l	Indicator: Percentage of States QMS certified								
1. QWIS TO! AIM		Supporting metric: Number of States QMS certification								
2. e-TOD implementar	tion	Indicator: Percentage of States e-TOD implemented								
2. C TOD imprementa	)	Supporting metric: Number of States with e-TOD implemented								
3. WGS-84 implement	tation		-	•	GS-84 implei		041 1 1			
1	3						-84 implemented			
4. AIXM implementat		Indicator: Percentage of States with AXIM implemented Supporting metric: Number of States with AXIM implemented								
		1 1					*			
5. e-AIP implementati	10n			•	tates with e-A					
		Supporting metric: Number of States with e-AIP implemented								
6   Hartal N. H. A. M.				dicator: Percentage of States with Digital NOTAM implemented apporting metric: Number of States with Digital NOTAM implemented						
							d Measurement	cu		
					: Performan					
Key Performance A							alitative benefits)			
Access & Equity		V/A			(	<b>4</b>				
Capacity		V/A								
Efficiency	Support Instrument procedure design implementation: Support aeronautical chart									
Environment					for promulgat	_	<del>-</del>	. 1		
LIIVIIOIIIICII	1	Caucu ?	anount OI	paper	ioi promuigat	IOII OI III	I OI IIIMUI OII			

Safety	Reduction in the number of possible inconsistencies
<b>-</b>	1

## -36 **1. AIR NAVIGATION REPORT FORM (ANRF)**

	Regional a	nd Natio								
	2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-10/FRTO									
Improved Operations through Enhanced En-route Trajectories										
Performance Improvement Area 3: Optimum Capacity and Flexible Flights										
- Through Global Collaborative ATM 3. ASBU B0-10/FRTO: Impact on Main Key Performance Areas (KPA)										
	Access &									
Equity Capacity Efficiency Environment Safe										
Applicable Y Y Y Y N										
<b>4.</b> A	ASBU B0-10/FRT	O: Planı	ning Ta							
5.	Elements			6. Targ		Implementa ound and Air		rogress		
1. Airspace plann	ing		Dece	ember 201	•	ouna ana An	1)			
2. Flexible use of				ember 201						
3. Flexible routin				ember 201						
	7. ASBU I	30-10/FR	TO: In	plementa	ation Ch	allenges				
				plementa						
Elements	Ground Syste		Avio		1	cedures		perational		
	Implementati Lack of organiz		npieme	ntation	AVa	ailability	F	Approvals		
	and managed	zea								
1. Airspace	airspace prior to the time of flight. Lack of AIDC WGS-84		Nil		Lack of					
planning					Procedures					
	Survey				Loglag	£				
						Lack of implementation				
2. Flexible use	Nil	Nil	Nil		FUA Guidance					
of airspace					and coordination					
					agreements					
			Insufficient							
3. Flexible		901	nber of		Lack of LOAs		Poor parcentage			
routing	ADS-C/CPDLC	_	equipped aircraft / Lack of FANS		and procedures			Poor percentage of fleet approvals		
Touring			1/A. lack of		and procedures		of freet approvais			
			ARS							
8.	ASBU B0-10/FI						nent			
Elements	8A. ASBU I			_		omtoring orting Metri	ce			
1. Airspace	<b>X</b>				, r supp	or ung Mull	<b>C</b> B			
planning	Not assigned In									
2. Flexible use	Indicator: Perce		time se	gregated a	irspaces	are available	for c	ivil		
of airspace	of aircrace operations in the State									
Supporting metric: Reduction of delays in time of civil flights  Indicator: Percentage of PBN routes implemented										
3. Flexible Supporting metric: KG of Fuel sayings										
routing Supporting metric: Tons of CO2 reduction										
8. ASBU B0-10/FRTO: Performance Monitoring and Measurement										
8B. ASBU B0-10/FRTO: Performance Monitoring										
Key Performance		Matria	g ( <b>if</b> mar	t indicat	0 grali4	ativa basa64	a)			
Areas		Metric	5 (п по	ı , maicat	e quant	ative benefit	5 <i>)</i>			
	Better access to	airspace	by a red	duction of	the nerr	nanently seg	egate	d volumes of		
Access & Equity	airspace	шэрисс					-5410			
			_					_		

	Flexible routing reduces potential congestion on trunk routes and at busy crossing
Capacity	points. The flexible use of airspace gives greater possibilities to separate flights
	horizontally. PBN helps to reduce route spacing and aircraft separations.
	In particular the module will reduce flight length and related fuel burn and
Efficiency	emissions. The module will reduce the number r of flight diversions and
	cancellations. It will also better allow avoiding noise-sensitive areas.
Environment	Fuel burn and emissions will be reduced
Safety	N/A

#### 1. AIR NAVIGATION REPORT FORM (ANRF) Regional and National planning for ASBU Modules

				RMANCE OBJECT			
Imp	roved Flow 1	Performance th	rough P	lanning based on a N	Network-Wide view		
Po	rformanco I	mnrovement A	raa 3: N	ptimum Capacity an	d Flavible Flights		
	1101 mance n			Collaborative ATM	d Flexible Flights		
3	. ASBU BO			Iain Key Performan	ce Areas (KPA)		
	Access	& <u> </u>			Environment	Safety	
	Equity		acity	Efficiency			
Applicable	Y		<u>Y</u>	Y	Y	Y	
4	I. ASBU BO	-35/NOPS: Plai	nning Ta	argets and Implemen			
5.	Elements				Implementation Pro ound and Air)	gress	
1. Air Traffic Flow M	anagement		Decem	ber 2015	unu anu An)		
		ASBU B0-35/N	1	nplementation Chall	enges		
				Implementation	_		
Elements	\$	Ground Sys	stem	Avionics	Procedures	Operational	
		Implementa		Implementation	Availability	Approvals	
		Lack for system			T 1 CATEDA		
1 Air Troffic Flow M		software for ATFM. Lack of ATFM units		Nil	Lack of ATFM and		
1. Air Traffic Flow M	anagement	implemented.	i umis	INII	CDM procedures. Lack of training	***	
		Funding			Lack of training		
	8. ASBU I		erforma	nce Monitoring and	Measurement —		
				nplementation Moni			
Elements	<b>I</b>			rmance Indicators / S			
1. Air Traffic Flow Management  Indicator: Percentage of implemented FMUs  Support of State and ATEM and the							
				mber of States with A		ted	
				nce Monitoring and Performance Monito			
Key Performanc		. ASDC D0-33/		ics (if not, indicate q			
		Improved acce			· · · · · · · · · · · · · · · · · · ·	v avoiding	
Access & Equity		Improved access and equity in the use of airspace or aerodrome by avoiding disruption of air traffic. ATFM processes take care of equitable distribution of					
		delays					
				ailable capacity, abili	•		
Capacity	Capacity		mitigate them in advance. Number of aircrafts in a defined volume or airspace for				
		a period of tim		4-1-44	-f.Cl	1 1.1 1	
Efficiency		and times with		to better anticipation	of flow issues; Reduc	ea block times	
				elays are absorbed on	the ground with shu	t engines: or at	
Environment							
		optimum flight levels through speed or route management. Reduced CO2 emissions per flight					
Safety		Reduced occur	rrences o	f undesired sector over	erloads		

# -38 1. AIR NAVIGATION REPORT FORM (ANRF) Regional and National planning for ASBU Modules

2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-101/ACAS ACAS Improvements							
			Through	Global	ptimum Capacity ar Collaborative ATM		
3.			CAS: Imp	pact on l	Main Key Performa	nce Areas (KPA)	
	Access Equi		Capa	acity	Efficiency	Environment	Safety
Applicable	N		-	N	Y	N	Y
4.	. ASBU BO	)-101/A	CAS: Pla	nning T	argets and Impleme		
5.	Elements					Implementation P	rogress
					,	ound and Air)	
1. ACAS II (TCAS V			<del>-</del>	2013-2			
	7.	ASBU	B0-101/A	CAS: I	mplementation Cha	_	
<b>T</b>		Implementation Area					0 4 1
Elements		Ground System Implementation		Avionics	Procedures	Operational	
1 ACAS II (TCAS V	orgion 7.1)	Nil	inplementation		<b>Implementation</b> Equipage	Availability Nil	Approvals Nil
		A CAS. D	CAS: Performance Monitoring and Measurement				
					mplementation Mor		
Elements				Perfor	mance Indicators / S	Supporting Metric	S
1. ACAS II (TCAS V	ersion 7.1)				aircrafts that are equention in number of R.		
					ance Monitoring and		
		B. ASB	U <b>B0-101</b>		Performance Monit		
Key Performance	Areas			Metri	cs (if not, indicate q	ualitative benefits)	
Access & Equity		N/A					
Capacity					l reduce unnecessary	resolution advisory	(RA) and then
		reduce trajectory deviations					
Efficiency		N/A					
Environment		N/A					
Safety		Reduced number of potential AIR-PROX. ACAS increases safety in the case of					
Burety		breakdown of separation					

#### 1. AIR NAVIGATION REPORT FORM (ANRF)

Regional and National planning for ASBU Modules

Access &

2. Implementation of Multilateration

3. Automation system (Presentation)

## 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-84/ASUR Improved Flow Performance through Planning based on a Network-Wide view

Performance Improvement Area 3: Optimum Capacity and Flexible Flights
- Through Global Collaborative ATM

3.	ASBU B0-84/ASUR:	Impact on Main Key Perforn	nance Areas (KPA)
•		inpute on Main they i citoria	idilee illeds (lll il)

	Equity	Capacity	Efficiency	Environment	Sarety		
Applicable	N	Y	N	N	Y		
4. ASBU B0-84/ASUR: Planning Targets and Implementation Progress							
5. Elements			6. Targets and Implementation Progress				
			(Ground and Air)				
1. Implementation of	ADS-B	June 20	June 2018 – Users and service provider				

#### 7. ASBU B0-84/ASUR: Implementation Challenges

June 2018 – Users and service provider

June 2017 – Users and service provider

	Implementation Area				
Elements	Ground System Implementation	Avionics Implementation	Procedures Availability	Operational Approvals	
1. Implementation of ADS-B	Lack of ADS-B systems implementation due to recent implementation of conventional surveillance systems	Lack of ADS-B implementation in general aviation, and old commercial fleet	Lack of procedures	Lack of inspector s with appropriate capability	
2. Implementation of Multilateration	Facilities of remote stations. Establishment of communications networks	Nil	Nil	Lack of inspector s with appropriate capability	
3. Automation system (Presentation)	Lack of any automation functionality	Nil	Nil	Nil	

# 8. ASBU B0-84/ASUR: Performance Monitoring and Measurement 8A. ASBU B0-84/ASUR: Implementation Monitoring

Elements	Performance Indicators / Supporting Metrics
1. Implementation of ADS-B	Indicator: Percentage of international aerodromes with ADS-B implemented
	Supporting metric: Number of ADS-B implemented
2. Implementation of Indicator: Percentage of Multilateration system implemented Supporting	
Multilateration	metric: Number of Multilateration system implemented Indicator:
3. Automation system	Percentage of ATS units with automation system implemented
(Presentation)	Supporting metric: Number of automation system implemented in ATS units

### 8. ASBU B0-84/ASUR: Performance Monitoring and Measurement 8B. ASBU B0-84/ASUR: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)
Access & Equity	N/A
Capacity	Typical separation minima are 3 NM or 5 NM enabling an increase in traffic density compared to procedural minima. TMA surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.
Efficiency	N/A
Environment	N/A
Safety	Reduction of the number of major incidents. Support to search and rescue

#### 1. AIR NAVIGATION REPORT FORM (ANRF)

Regional and National planning for ASBU Modules

## 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-102/SNET Increased Effectiveness of Ground-based Safety Nets

Performance Improvement Area 3: Optimum Capacity and Flexible Flights
- Through Global Collaborative ATM

3. ASBU B0-102/SNET: Impact on Main Key Performance Areas (KPA)

			· ·	. ,			
	Access & Equity	Capacity	Efficiency	Environment	Safety		
Applicable	N	N	NN	N	Y		
4	4. ASBU B0-102/SNET: Planning Targets and Implementation Progress						
5. Elements			6. Targets and Implementation Progress				
			(Ground and Air)				

	( )		
1. Short Term Conflict Alert (STCA)	June 2014 / Service provider 2013-2018		
2. Area Proximity Warning (APW)	June 2014 / Service provider 2013-2018		
O M O C ALL I XXI . (MCAXXI)	1 2014		

3. Minimum Safe Altitude Warning (MSAW) June 2014

4. Dangerous Area Infringement Warning (DAIW) 2013-2018

#### 7. ASBU B0-102/SNET: Implementation Challenges

	Implementation Area					
Elements	<b>Ground System</b>	Avionics	Procedures	Operational		
	Implementation	Implementation	Availability	Approvals		
1. Short Term Conflict Alert (STCA)	Nil Funding	Nil	Nil	Nil		
2. Area Proximity Warning (APW)	Nil Funding	Nil	Nil	Nil		
3. Minimum Safe Altitude Warning (MSAW)	Nil Funding	Nil	Nil	Nil		
4. Dangerous Area Infringement Warning (DAIW)	Funding					

#### 8. ASBU B0-102/SNET: Performance Monitoring and Measurement 8A. ASBU B0-102/SNET: Implementation Monitoring

r · · · · · · · · · · · · · · · · · · ·			
Elements	Performance Indicators / Supporting Metrics		
1. Short Term Conflict	Indicator: Percentage of ATS units with ground-based safety nets (STCA) implemented		
Alert (STCA)	Supporting metric: Number of safety net (STCA) implemented		
2. Area Proximity	Indicator: Percentage of ATS units with ground-based safety nets (APW)implemented		
Warning (APW)	Supporting metric: Number of safety net (APW)implemented		
3. Minimum Safe Altitude Warning (MSAW)	Indicator: Percentage of ATS units with ground-based safety nets (MSAW) implemented Supporting metric: Number of safety net (MSAW) implemented		
4. Dangerous Area Infringement Warning (DAIW)	Indicator: Percentage of ATS units with ground-based safety nets (DAIW) implemented Supporting metric: Number of safety net (DAIW) implemented		

#### 8. ASBU B0-102/SNET: Performance Monitoring and Measurement 8B. ASBU B0-102/SNET CAS: Performance Monitoring

Key Performance Areas	Metrics (if not, indicate qualitative benefits)				
Access & Equity	N/A				
Capacity	N/A				
Efficiency	N/A				
Environment	N/A				
Safety	Significant reduction of the number of major incidents				

# -42 1. AIR NAVIGATION REPORT FORM (ANRF) Regional and National planning for ASBU Modules

# 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-05/CDO Improved

						rajectory-based (	Operations		
A	Access & Equity	Capa	act on Main Key Performancity Efficience			Environment	Safety		
Applicable	N			Y		N	NY		
4. A	SBU B0-05/C	CDO: Plan	ning Ta			ation Progress			
5. Elem	ents			•	,	mplementation P and and Air)	rogress		
1. CDO implementation			I	December 2017					
2. PBN STARs implementa			Decemb		~~~				
	7. ASB	U B0-05/0	CDO: Im	plementation					
Elamanta	C				entation .				
Elements	Implem	Ground System Implementation		Avionics Implementation		vailability	Operational Approvals		
1. CDO implementation	trajector calculati function need to a	The ground trajectory calculation function will need to able upgraded		CDO Function		nd Training	In accordance with applicable requirements		
2. PBN STARs implementation	1	Airspace Design		Nil		nd Training			
8.					_	<b>Ieasurement</b>			
	8A. ASB			plementation					
Elements	Indicator				_	porting Metrics			
1. CDO implementation		ge of international aerodromes/TMAs with CDO implemented Number of international aerodromes/TMAs with CDO							
2. PBN STARs Indicator: Percentage of international aerodromes with PBN STARs imple						•			
implementation		Supporting metric: Number of international airport with PBN STARs implementations SBU B0-05/CDO: Performance Monitoring and Measurement							
8.				ce Monitor erformance					
Key Performance Areas		БС Б0-03							
Access & Equity	N/A	Metrics (if not , indicate qualitative benefits)  N/A							
Capacity	Increase	Increased Terminal Airspace Capacity N/A							
Efficiency		Cost savings through reduced fuel burn. Reduction in the number of required radio transmissions.							
Environment	Reduced	emissions	s as a resu	ılt of reduce	d fuel buri	1.			
Safety	More co	nsistent fli	oht naths	and stabiliz	red approa	ch. Reduction in t	he number of		

# 1. AIR NAVIGATION REPORT FORM (ANRF) Regional and National planning for ASBU Modules

# 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-20/CCO Improved

						Trajectory-based (	Operations		
3	ASBU B0-20/C	CO: Impa	act on Ma	ain Key Pei	forman	ce Areas (KPA)			
	Equity	Capa	Capacity Efficiency  NY Y		ency	Environment	Safety		
Applicable	Y					NY	NY		
4	. ASBU B0-20/0	CCO: Plan	ning Tai						
5. Elements			6. Targets and Implementation Progress (Ground and Air)						
1. CCO implementatio	n		Decemb	ver 2017	(Gr	ouna ana Air)			
2. PBN SIDs implement			Decemb						
2. TBT ( BIB's Impreme)		U B0-20/0	l .	plementation	on Chall	enges			
				Implem					
<b>Elements</b>	Ground	Ground System Implementation		Avionics Implementation		Procedures	Operational		
	Implem					Availability	Approvals		
		Nil Airspace Design		Nil Nil			In accordance		
1. CCO implementatio	n Nil						with applicable		
							requirements		
2. PBN SIDs implement	ntation   Airspace						Approvals of procedures		
	8. ASBU B0-20	/CCO: Pe	rforman	ce Monitor	ing and	Measurement	procedures		
	8A. ASB	U B0-20/0	CCO: Im	plementatio	on Moni	toring			
Elements						upporting Metrics			
1. CCO implementatio		Indicator: Percentage of international aerodromes with CCO implemented							
1. eeo implementatio	Support	Supporting metric: Number of international airports with CCO implemented							
2. PBN SIDs implemen		Indicator: Percentage of international aerodromes with PBN SIDs implemented Supporting metric: Number of international airports with PBN SIDs implemented							
	8. <b>ASBU B0-2</b> 0						simplemented		
				erformance					
Key Performance A		<b>DC DC 2</b> 0				alitative benefits)			
Access & Equity									
Capacity	Increase	Increased Terminal Airspace Capacity							
Efficiency		Cost savings through reduced fuel burn and efficient aircraft operating profiles.							
		Reduction in the number of required radio transmissions.							
Environment		Authorization of operations where noise limitations would otherwise result in							
		operations being curtailed or restricted. Environmental benefits through reduced emissions.							
		More consistent flight paths. Reduction in the number of required radio transmissions.							
Safety		Lower pilot and air traffic control workload.							

# -44 1. AIR NAVIGATION REPORT FORM (ANRF) Regional and National planning for ASBU Modules

# 2. REGIONAL /NATIONAL PEROFRMANCE OBJECTIVE – B0-40/TBO

					igh Trajectory-l		perations		
3.	ASBU B0-40/TBO: Impac Access & Capac Equity					Environment			
Applicable	N			Y	Y		Y		
4.	ASBU B0-40/T	BO: Plann	ing Targ		mentation Prog				
5. Elements				6. Targets and Implementation Progress (Ground and Air)					
1. ADS-C over oceanic a	nd remote areas		June 2018 – Service provider						
2. Continental CPDLC	- 4 070	T. T. O. 40 //ED	June 2018 – Service provider						
	7. ASB	U <b>B0-40/11</b>		lementation C					
Elements	Cround S	nound Crestom		Implementation Avionics	Procedures	edures Operational			
Elements	Ground System Implementation		l .	lementation	Availability	Approvals			
1. ADS-C over oceanic and remote areas	Funding and limited link service provider and infrastructure		ADS-C	nentation of in general n pending	Implementati on of GOLD procedures pending	Lack of duly trained inspectors for approve of operations			
2. Continental CPDLC	Funding and limited link service provider and infrastructure		Implementation of CPDLC in general aviation pending		Implementati on of GOLD procedures pending		f duly trained ors for approval rations		
8					and Measureme	nt			
Elements	δA. ASB			lementation N	Supporting Met	rice			
1. ADS-C over oceanic	Indicator: Perc					iics			
and remote areas		Indicator: Percentage of FIRs with ADS-C implemented Supporting metric: Number of ADS-C approved procedures over oceanic and remote areas							
2. Cantinantal CDDL C	Indicator: Perc								
2. Continental CPDLC Supporting metric: Number of CPDLC approved procedures over continental? areas									
8				e Monitoring a rformance Mo	and Measuremen	nt			
Key Performance A		20 20 10, 2			te qualitative be	nefits)			
Access & Equity N/A									
^ •			fts in a defined airspace for a period of time						
			fuel saved per flight. Reduction of separation						
				n as a result of reduced fuel burn					
Safety adherence monitor rescue. Reduced o			ety nets supports cleared level adherence monitoring, route oring, danger area infringement warning and improved search and occurrences of misunderstandings; solution to stuck microphone sed situational awareness						

### PERFORMANCE IMPROVEMENT AREA 1: AIRPORT OPERATIONS

#### **B0-APTA** Optimization of Approach Procedures including Vertical Guidance

The use of performance-based navigation (PBN) and ground-based augmentation system (GBAS) landing system (GLS) procedures to enhance the reliability and predictability of approaches to runways, thus increasing safety, accessibility and efficiency. This is possible through the application of basic global navigation satellite system (GNSS), Baro-vertical navigation (VNAV), satellite-based augmentation system (SBAS) and GLS. The flexibility inherent in PBN approach design can be exploited to increase runway capacity.

#### **Applicability**

This Module is applicable to all instrument, and precision instrument runway ends, and to a limited extent, non-instrument runway ends.

**Benefits** 

Access and Equity: Increased aerodrome accessibility.

Capacity: In contrast with instrument landing systems (ILS), the GNSS-based approaches (PBN and GLS) do not require the definition and management of sensitive and critical areas. This results in increased runway capacity where applicable.

Efficiency: Cost savings related to the benefits of lower approach minima: fewer diversions, over flights, cancellations and delays. Cost savings related to higher airport capacity in certain circumstances (e.g. closely spaced parallels) by taking advantage of the flexibility to offset approaches and define displaced thresholds.

Environment: Environmental benefits through reduced

fuel burn.

Safety: Stabilized approach paths.

Cost: Aircraft operators and Air Navigation Service Providers (ANSPs) can quantify the benefits of lower minima by using historical aerodrome weather observations and modelling airport accessibility with existing and new minima. Each aircraft operator can then assess benefits against the cost of any required avionics upgrade. Until there are GBAS (CAT II/III) Standards, GLS cannot be considered as a candidate to globally replace ILS. The GLS business case needs to consider the cost of retaining ILS or MLS to allow continued operations during an interference event.

# B0-WAKE Increased Runway Throughput through Optimized Wake Turbulence Separation

Improves throughput on departure and arrival runways through optimized wake turbulence separation minima, revised aircraft wake turbulence categories and procedures.

#### **Applicability**

Least complex – Implementation of revised wake turbulence categories is mainly procedural. No changes to automation systems are needed.

**Benefits** 

Access and Equity: Increased aerodrome

accessibility. Capacity:

- a) Capacity and departure/arrival rates will increase at capacity constrained aerodromes as wake categorization changes from three to six categories.
- b) Capacity and arrival rates will increase at capacity constrained aerodromes as specialized and tailored procedures for landing operations for on-parallel runways, with centre lines spaced less than 760 m (2 500 ft) apart, are developed and implemented.
- c) Capacity and departure/arrival rates will increase as a result of new procedures which will reduce the current two-three minutes delay times. In addition, runway occupancy time will decrease as a result of these new procedures.

Flexibility Aerodromes can be readily configured to operate on three (i.e. existing H/M/L) or six wake turbulence categories, depending on demand.

Cost: Minimal costs are associated with the implementation in this Module. The benefits are to the users of the aerodrome runways and surrounding airspace, ANSPs and operators. Conservative wake turbulence separation standards and associated procedures do not take full advantage of the maximum utility of runways and airspace. U.S. air carrier data shows that, when operating from a capacity- constrained aerodrome, a gain of two extra departures per hour has a major beneficial effect in reducing delays.

The ANSP may need to develop tools to assist controllers with the additional wake turbulence categories and decision support tools. The tools necessary will depend on the operation at each airport and the number of wake turbulence categories implemented.

#### B0-SURF Safety and Efficiency of Surface Operations (A-SMGCS Level 1-2)

Basic advanced-surface movement guidance and control systems (A-SMGCS) provides surveillance and alerting of movements of both aircraft and vehicles at the aerodrome, thus improving runway/aerodrome safety. Automatic dependent surveillance-broadcast (ADS-B) information is used when available (ADS-B APT).

Applicability

A SMCCTS is applied to the applied to the applied to the active runways at a time and the runway width of minimum 45 m.

#### **Benefits**

Access and Equity: A-SMGCS improves access to portions of the manoeuvring area obscured from view of the control tower for vehicles and aircraft. Sustains an improved aerodrome capacity during periods of reduced visibility. Ensures equity in ATC handling of surface traffic regardless of the traffic's position on the aerodrome.

ADS-B APT, as an element of an A-SMGCS system, provides traffic situational awareness to the controller in the form of surveillance information. The availability of the data is dependent on the aircraft and vehicle level of equipage.

Capacity: A-SMGCS: sustained levels of aerodrome capacity for visual conditions reduced to minima lower than would otherwise be the case.

ADS-B APT: as an element of an A-SMGCS system, potentially improves capacity for medium complexity aerodromes.

Efficiency: A-SMGCS: reduced taxi times through diminished requirements for intermediate holdings based on reliance on visual surveillance only.

ADS-B APT: as an element of an A-SMGCS, potentially reduces occurrence of runway collisions by assisting in the detection of the incursions.

Environment: Reduced aircraft emissions stemming from improved efficiencies.

Safety: A-SMGCS: reduced runway incursions. Improved response to unsafe situations. Improved situational awareness leading to reduced ATC workload.

ADS-B APT: as an element of an A-SMGCS system, potentially reduces the occurrence of occurrence of runway collisions by assisting in the detection of the incursions.

Cost: A-SMGCS: a positive CBA can be made from improved levels of safety and improved efficiencies in surface operations leading to significant savings in aircraft fuel usage. As well, aerodrome operator vehicles will benefit from improved access to all areas of the aerodrome, improving the efficiency of aerodrome operations, maintenance and servicing.

ADS-B APT: as an element of an A-SMGCS system less costly surveillance solution for medium complexity aerodromes.

#### **B0-ACDM** Improved Airport Operations through Airport-CDM

Implements collaborative applications that will allow the sharing of surface operations data among the different stakeholders on the airport. This will improve surface traffic management reducing delays on movement and manoeuvring areas and enhance safety, efficiency and situational awareness.

Applicability

Local for equipped/capable fleets and already established airport surface infrastructure.

#### **Benefits**

Capacity: Enhanced use of existing infrastructure of gate and stands (unlock latent capacity). Reduced workload, better organization of the activities to manage flights.

Efficiency: Increased efficiency of the ATM system for all stakeholders. In particular for aircraft operators: improved situational awareness (aircraft status both home and away); enhanced fleet predictability and punctuality; improved operational efficiency (fleet management); and reduced delay.

Environment: Reduced taxi time; reduced fuel and carbon emission; and lower aircraft engine run time.

Cost: The business case has proven to be positive due to the benefits that flights and the other airport operational stakeholders can obtain. However, this may be influenced depending upon the individual situation (environment, traffic levels investment cost, etc.).

A detailed business case has been produced in support of the EU regulation which was solidly positive.

#### **B0-RSEQ** Improve Traffic Flow through Sequencing (AMAN/DMAN)

Manage arrivals and departures (including time-based metering) to and from a multi-runway aerodrome or locations with multiple dependent runways at closely proximate aerodromes, to efficiently utilize the inherent runway capacity.

#### **Applicability**

Runways and terminal manoeuvring area in major hubs and metropolitan areas will be most in need of these improvements.

The improvement is least complex – runway sequencing procedures are widely used in aerodromes globally. However some locations might have to confront environmental and operational challenges that will increase the complexity of development and implementation of technology and procedures to realize this Module.

#### **Benefits**

Capacity: Time-based metering will optimize usage of terminal airspace and runway capacity. Optimized utilization of terminal and runway resources.

Efficiency: Efficiency is positively impacted as reflected by increased runway throughput and arrival rates. This is achieved through:

- a) Harmonized arriving traffic flow from en-route to terminal and aerodrome. Harmonization is achieved via the sequencing of arrival flights based on available terminal and runway resources.
- b) Streamlined departure traffic flow and smooth transition into en-route airspace. Decreased lead time for departure request and time between call for release and departure time. Automated dissemination of departure information and clearances.

Predictability: Decreased uncertainties in aerodrome/terminal demand

prediction.

Flexibility: By enabling dynamic scheduling.

Cost: A detailed positive business case has been built for the time-based flow management programme in the United States. The business case has proven the benefit/cost ratio to be positive. Implementation of time-based metering can reduce airborne delay. This capability was estimated to provide over 320,000 minutes in delay reduction and \$28.37 million in benefits to airspace users and passengers over the evaluation period.

Results from field trials of DFM, a departure scheduling tool in the United States, have been positive. Compliance rate, a metric used to gauge the conformance to assigned departure time, has increased at field trial sites from sixty-eight to seventy-five per cent. Likewise, the EUROCONTROL DMAN has demonstrated positive results. Departure scheduling will streamline flow of aircraft feeding the adjacent center airspace based on that center's constraints. This capability will facilitate more accurate estimated time of arrivals (ETAs). This allows for the continuation of metering during heavy traffic, enhanced efficiency in the NAS and fuel efficiencies. This capability is also crucial for extended metering.

# PERFORMANCE IMPROVEMENT AREA 2: GLOBALLY INTEROPERABLE SYSTEMS AND DATA

# **B0-FICE** Increased Interoperability, Efficiency and Capacity though Ground-Ground Integration

Improves coordination between air traffic service units (ATSUs) by using ATS interfacility data communication (AIDC) defined by ICAO's *Manual of Air Traffic Services Data Link Applications* (Doc 9694). The transfer of communication in a data link environment improves the efficiency of this process, particularly for oceanic ATSUs.

#### Applicability

Applicable to at least two area control centres (ACCs) dealing with en-route and/or terminal control area (TMA) airspace. A greater number of consecutive participating ACCs will increase the benefits.

#### **Benefits**

Capacity: Reduced controller workload and increased data integrity supporting reduced separations translating directly to cross sector or boundary capacity flow increases.

Efficiency: The reduced separation can also be used to more frequently offer aircraft flight levels closer to the flight optimum; in certain cases, this also translates into reduced en-route holding.

Interoperability: Seamlessness: the use of standardized interfaces reduces the cost of development, allows air traffic controllers to apply the same procedures at the boundaries of all participating centres and border crossing becomes more transparent to flights.

Safety: Better knowledge of more accurate flight plan information.

Cost: Increase of throughput at ATS unit boundary and reduced ATCO workload will outweigh the cost of FDPS software changes. The business case is dependent on the environment.

#### **B0-DATM** Service Improvement through Digital Aeronautical Information Management

The initial introduction of digital processing and management of information through, aeronautical information service (AIS)/aeronautical information management (AIM) implementation, use of aeronautical exchange model (AIXM), migration to electronic aeronautical information publication (AIPO and better quality and availability of data.

#### **Applicability**

Applicable at State level with increased benefits as more States

participate.

**Benefits** 

Environment: Reducing the time necessary to promulgate information concerning airspace status will allow for more effective airspace utilization and allow improvements in trajectory management.

Safety: Reduction in the number of possible inconsistencies. Module allows reducing the number of manual entries and ensures consistency among data through automatic data checking based on commonly agreed business rules.

Interoperability: Essential contribution to interoperability.

Cost: Reduced costs in terms of data inputs and checks, paper and post, especially when considering the overall data chain, from originators, through AIS to the end users. The business case for the aeronautical information conceptual model (AIXM) has been conducted in Europe and in the United States and has shown to be positive.

The initial investment necessary for the provision of digital AIS data may be reduced through regional cooperation and it remains low compared with the cost of other ATM systems. The transition from paper products to digital data is a critical pre-requisite for the implementation of any current or future ATM or Air Navigation concept that relies on the accuracy, integrity and timeliness of data.

# **B0-AMET** Meteorological Information Supporting Enhanced Operational Efficiency and Safety

Global, regional and local meteorological information:

- a) Forecasts provided by world area forecast centres (WAFCs), volcanic ash advisory centres (VAACs) and tropical cyclone advisory centres (TCAC).
- b) Aerodrome warnings to give concise information of meteorological conditions that could adversely affect all aircraft at an aerodrome, including wind shear.
- c) SIGMETs to provide information on occurrence or expected occurrence of specific enroute weather phenomena which may affect the safety of aircraft operations and other operational meteorological (OPMET) information, including METAR/SPECI and TAF, to provide routine and special observations and forecasts of meteorological conditions occurring or expected to occur at the aerodrome.

This information supports flexible airspace management, improved situational awareness and collaborative decision-making, and dynamically-optimized flight trajectory planning. This Module includes elements which should be viewed as a subset of all available meteorological information that can be used to support enhanced operational efficiency and safety

#### **Applicability**

Applicable to traffic flow planning, and to all aircraft operations in all domains and flight phases, regardless of level of aircraft equipage.

#### Benefits

Capacity: Optimized use of airspace capacity. Metric: ACC and aerodrome throughput.

Efficience department reduced arrival and departure holding times and thus reduced fuel burn. Metric: Fuel consumption and flight time punctuality.

Environment: Reduced fuel burn through optimized departure and arrival profiling/scheduling. Metric: Fuel burn and emissions.

Safety: Increased situational awareness and improved consistent and collaborative decision making. Metric: Incident occurrences.

Interoperability: Gate-to-gate seamless operations through common access to, and use of, the available WAFS, IAVW and tropical cyclone watch forecast information. Metric: ACC throughput.

Predictability: Decreased variance between the predicted and actual air traffic schedule. Metric: Block time variability, flight-time error/buffer built into schedules.

Participation: Common understanding of operational constraints, capabilities and needs, based on expected (forecast) meteorological conditions. Metric: Collaborative decision-making at the aerodrome and during all phases of flight.

Flexibility: Supports pre-tactical and tactical arrival and departure sequencing and thus dynamic air traffic scheduling. Metric: ACC and aerodrome throughput.

Cost: Reduction in costs through reduced arrival and departure delays (viz. reduced fuel burn). Metric: Fuel consumption and associated costs.

#### PERFORMANCE IMPROVEMENT AREA 3: OPTIMUM CAPACITY AND FLEXIBLE FLIGHTS

#### **B0-FRTO** Improved Operations through Enhanced En-route Trajectories

Allow the use of airspace which would otherwise be segregated (i.e. Special Use Airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight lengths and fuel burn.

#### **Applicability**

Applicable to en-route airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits, in particular for flex track aspects. Benefits accrue to individual flights and flows. Application will naturally span over a long period as traffic develops. Its features can be introduced starting with the simplest ones.

#### Benefits

Access and Equity: Better access to airspace by a reduction of the permanently segregated

volumes. Capacity: The availability of a greater set of routing possibilities allows reducing

#### potential congestion on

trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations. This in turn allows reducing controller workload by flight.

Efficiency: The different elements concur to trajectories closer to the individual optimum by reducing constraints imposed by permanent design. In particular the Module will reduce flight length and related fuel burn and emissions. The potential savings are a significant proportion of the ATM related inefficiencies. The Module will reduce the number of flight diversions and cancellations. It will also better allow avoidance of noise sensitive areas.

Environment: Fuel burn and emissions will be reduced; however, the area where emissions and contrails will be formed may be larger.

Predictability: Improved planning allows stakeholders to anticipate on expected situations and be better prepared.

Flexibility: The various tactical functions allow rapid reaction to changing conditions.

Cost: FUA: In the United Arab Emirates (UAE) over half of the airspace is military. Opening up this airspace could potentially enable yearly savings in the order of 4.9 million litres of fuel and 581 flight hours. In the United States a study for NASA by Datta and Barington showed maximum savings of dynamic use of FUA of \$7.8M (1995\$).

Flexible routing: Early modelling of flexible routing suggests that airlines operating a 10-hour intercontinental flight can cut flight time by six minutes, reduce fuel burn by as much as 2% and save 3,000 kilograms of CO2 emissions. In the United States RTCA NextGen Task Force Report, the weak of the registering of the productivity of the registering o

Annual operator benefit in 2018 of \$39,000 per equipped aircraft (2008 dollars) growing to \$68,000 per aircraft in 2025 based on the FAA Initial investment Decision. For the high throughput, high capacity benefit case (in 2008 dollars): total operator benefit is \$5.7B across programme lifecycle (2014-2032, based on the FAA initial investment decision).

### B0-NOPS Improved Flow Performance through Planning based on a Network-wide view

Air traffic flow management (ATFM) is used to manage the flow of traffic in a way that minimizes delays and maximizes the use of the entire airspace. ATFM can regulate traffic flows involving departure slots, smooth flows and manage rates of entry into airspace along traffic axes, manage arrival time at waypoints or flight information region (FIR)/sector boundaries and reroute traffic to avoid saturated areas. ATFM may also be used to address system disruptions including crisis caused by human or natural phenomena.

Applicability: Region or subregion. Benefits

Access and Equity: Improved access by avoiding disruption of air traffic in periods of demand higher than capacity. ATFM processes take care of equitable distribution of delays.

Capacity: Better utilization of available capacity, network-wide; in particular the trust of ATC not being faced by surprise to saturation tends to let it declare/use increased capacity levels; ability to anticipate difficult situations and mitigate them in advance.

Efficiency: Reduced fuel burn due to better anticipation of flow issues; a positive effect to reduce the impact of inefficiencies in the ATM system or to dimension it at a size that would not always justify its costs (balance between cost of delays and cost of unused capacity). Reduced block times and times with engines on.

Environment: Reduced fuel burn as delays are absorbed on the ground, with shut engines; rerouting however generally put flight on a longer distance, but this is generally compensated by other airline operational benefits.

Safety: Reduced occurrences of undesired sector overloads.

Predictability: Increased predictability of schedules as the ATFM algorithms tend to limit the number of large delays.

Participation: Common understanding of operational constraints, capabilities and needs.

Cost: The business case has proven to be positive due to the benefits that flights can obtain in terms of delay reduction.

#### **B0-ASUR** Initial Capability for Ground Surveillance

Provides initial capability for lower cost ground surveillance supported by new technologies such as ADS-B OUT and wide area multilateration (MLAT) systems. This capability will be expressed in various ATM services, e.g. traffic information, search and rescue and separation provision.

#### **Applicability**

This peral description of the period of the

#### **Benefits**

Capacity: Typical separation minima are 3 NM or 5 NM enabling a significant increase in traffic density compared to procedural minima. Improved coverage, capacity, velocity vector performance and accuracy can improve ATC performance in both radar and non-radar environments. Terminal area surveillance performance improvements are achieved through high accuracy, better velocity vector and improved coverage.

Efficiency: Availability of optimum flight levels and priority to the equipped aircraft and operators. Reduction of flight delays and more efficient handling of air traffic at FIR boundaries. Reduces workload of air traffic controllers.

Safety: Reduction of the number of major incidents. Support to search and rescue.

Cost: Either comparison between procedural minima and 5 NM separation minima would allow an increase of traffic density in a given airspace; or comparison between installing/renewing SSR Mode S stations using Mode S transponders and installing ADS-B OUT (and/or MLAT systems).

#### **B0-ASEP** Air Traffic Situational Awareness (ATSA)

Two air traffic situational awareness (ATSA) applications which will enhance safety and efficiency by providing pilots with the means to enhance traffic situational awareness and achieve quicker visual acquisition of targets:

a) AIRB (basic airborne situational awareness during flight

operations). b) VSA (visual separation on approach).

#### **Applicability**

These are cockpit-based applications which do not require any support from the ground hence they can be used by any suitably equipped aircraft. This is dependent upon aircraft being equipped with ADS-B OUT. Avionics availability at low enough costs for GA is not yet available.

#### **Benefits**

Efficiency: Improve situational awareness to identify level change opportunities with current separation minima (AIRB) and improve visual acquisition and reduction of missed approaches (VSA).

Safety: Improve situational awareness (AIRB) and reduce the likelihood of wake turbulence encounters (VSA). Cost: The cost benefit is largely driven by higher flight efficiency and consequent savings in contingency fuel. The benefit analysis of the EUROCONTROL CRISTAL ITP project of the CASCADE Programme and subsequent update had shown that ATSAW AIRB and ITP together are capable of providing the following benefits over North Atlantic:

- a) Saving 36 million Euro (50K Euro per aircraft) annually.
- b) Reducing carbon dioxide emissions by 160,000 tonnes annually.

The majority of these benefits are attributed to AIRB. Findings will be refined after the completion of the pioneer operations starting in December 2011.

## B0-OPFL Improved Access to Optimum Flight Levels through Climb/Descent Procedures using ADS $B)\,$

Enables aircraft to reach a more satisfactory flight level for flight efficiency or to avoid turbulence for safety. The main benefit of ITP is significant fuel savings and the uplift of greater payloads.

#### **Applicability**

This can be applied to routes in procedural airspaces.

#### **Benefits**

Capacity: Improvement in capacity on a given air route.

Efficiency: Increased efficiency on oceanic and potentially continental en-route.

Environment: Reduced emissions.

Safety: A reduction of possible injuries for cabin crew and passengers.

#### **B0-ACAS** Airborne Collision Avoidance Systems (ACAS) Improvements

Provides short-term improvements to existing airborne collision avoidance systems (ACAS) to reduce nuisance alerts while maintaining existing levels of safety. This will reduce trajectory deviations and increase safety in cases where there is a breakdown of separation.

#### **Applicability**

Safety and operational benefits increase with the proportion of

equipped aircraft. Benefits

Efficiency: ACAS improvement will reduce unnecessary resolution advisory (RA) and then reduce trajectory deviations.

Safety: ACAS increases safety in the case of breakdown of separation.

#### **B0-SNET** Increased Effectiveness of Ground-Based Safety Nets

Monitors the operational environment during airborne phases of flight to provide timely alerts on the straight and an increased are trained as long as the operational concept remains human centred.

#### **Applicability**

Benefits increase as traffic density and complexity increase. Not all ground-based safety nets are relevant for each environment. Deployment of this Module should be accelerated.

#### **Benefits**

Safety: Significant reduction of the number of major incidents.

Cost: The business case for this element is entirely made around safety and the application of ALARP (as low as reasonably practicable) in risk management.

#### Performance Improvement Area 4: Efficient Flight Paths

# **B0-CDO** Improved Flexibility and Efficiency in Descent Profiles using Continuous Descent Operations (CDOs)

Performance-based airspace and arrival procedures allowing aircraft to fly their optimum profile using continuous descent operations (CDOs). This will optimize throughput, allow fuel efficient descent profiles, and increase capacity in terminal areas.

#### **Applicability**

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

- a) Least complex regional/States/locations with some foundational PBN operational experience that could capitalize on near-term enhancements, which include integrating procedures and optimizing performance.
- b) More complex regional/State/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation.
- c) Most complex regional/State/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

#### Benefits

Efficiency: Cost savings and environmental benefits through reduced fuel burn. Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted. Reduction in the number of required radio transmissions. Optimal management of the top-of-descent in the en-route airspace.

Safety: More consistent flight paths and stabilized approach paths. Reduction in the incidence of controlled flight into terrain (CFIT). Separation with the surrounding traffic (especially free-routing). Reduction in the number of conflicts.

Predictability: More consistent flight paths and stabilized approach paths. Less need for vectors.

Cost: It is important to consider that CDO benefits are heavily dependent on each specific ATM environment. Nevertheless, if implemented within the ICAO CDO manual framework, it is envisaged that the benefit/cost ratio (BCR) will be positive. After CDO implementation in Los Angeles TMA (KLAX) there was a 50% reduction in radio transmissions and fuel savings averaging 125 pounds per flight (13.7 million pounds/year; 41 million pounds of CO2 emission).

The advantage of PBN to the ANSP is that PBN avoids the need to purchase and deploy navigation aids for each new route or instrument procedure.

# **B0-TBO** Improved Safety and Efficiency through the Initial Application of Data Link Enroute

Implements an initial set of data link applications for surveillance and communications in air traffic control (ATC), supporting flexible routing, reduced separation and improved safety.

#### Applicability

Requires good synchronization of airborne and ground deployment to generate significant benefits, in particular to those equipped. Benefits increase with the proportion of equipped aircraft.

#### **Benefits**

Capacity: Element 1: A better localization of traffic and reduced separations allow increasing the offered capacity.

Element 2: Reduced communication workload and better organization of controller tasks allowing increased sector capacity.

Efficiency: Element 1: Routes/tracks and flights can be separated by reduced minima, allowing flexible routings and vertical profiles closer to the user-preferred ones.

Safety: Element 1: Increased situational awareness; ADS-C based safety nets like cleared level adherence monitoring, route adherence monitoring, danger area infringement warning; and better support to search and rescue.

Element 2: Increased situational awareness; reduced occurrences of misunder-standings; solution to stuck microphone situations.

Flexibility: Element 1: ADS-C permits easier route change.

Cost: Element 1: The business case has proven to be positive due to the benefits that flights can obtain in terms of better flight efficiency (better routes and vertical profiles; better and tactical resolution of conflicts).

To be noted, the need to synchronize ground and airborne deployments to ensure that services are provided by the ground when aircraft are equipped, and that a minimum proportion of flights in the airspace under consideration are suitably equipped.

Element 2: The European business case has proved to be positive due to:

- a) the benefits that flights obtain in terms of better flight efficiency (better routes and vertical profiles; better and tactical resolution of conflicts); and
- b) reduced controller workload and increased capacity.

A detailed business case has been produced in support of the EU regulation which was solidly positive. To be noted, there is a need to synchronize ground and airborne deployments to ensure that services are provided by the ground when aircraft are equipped, and that a minimum proportion of flights in the airspace under consideration are suitably equipped.

# **B0-CCO** Improved Flexibility and Efficiency Departure Profiles – Continuous Climb Operations (CCO)

Implements continuous climb operations (CCO) in conjunction with performance-based navigation (PBN) to provide opportunities to optimize throughput, improve flexibility, enable fuel-efficient climb profiles, and increase capacity at congested terminal areas.

#### Applicability

Regions, States or individual locations most in need of these improvements. For simplicity and implementation success, complexity can be divided into three tiers:

- a) Least complex regional/States/locations with some foundational PBN operational experience that could capitalize on near-term enhancements, which include integrating procedures and optimizing performance.
- b) More complex regional/State/locations that may or may not possess PBN experience, but would benefit from introducing new or enhanced procedures. However, many of these locations may have environmental and operational challenges that will add to the complexities of procedure development and implementation.
- c) Most complex regional/State/locations in this tier will be the most challenging and complex to introduce integrated and optimized PBN operations. Traffic volume and airspace constraints are added complexities that must be confronted. Operational changes to these areas can have a profound effect on the entire State, region or location.

#### **Benefits**

Efficiency: Cost savings through reduced fuel burn and efficient aircraft operating profiles. Reduction in the number of required radio transmissions.

Environment: Authorization of operations where noise limitations would otherwise result in operations being curtailed or restricted. Environmental benefits through reduced emissions.

Safety: More consistent flight paths. Reduction in the number of required radio transmissions. Lower pilot and air traffic control workload.

-60 Cost: It is important to consider that CCO benefits are heavily dependent on the specific ATM environment. Nevertheless, if implemented within the ICAO CCO manual framework, it is envisaged that the benefit/cost ratio (BCR) will be positive.